Refrigeration

National Association of Ice Industries **Nov. 15-18**

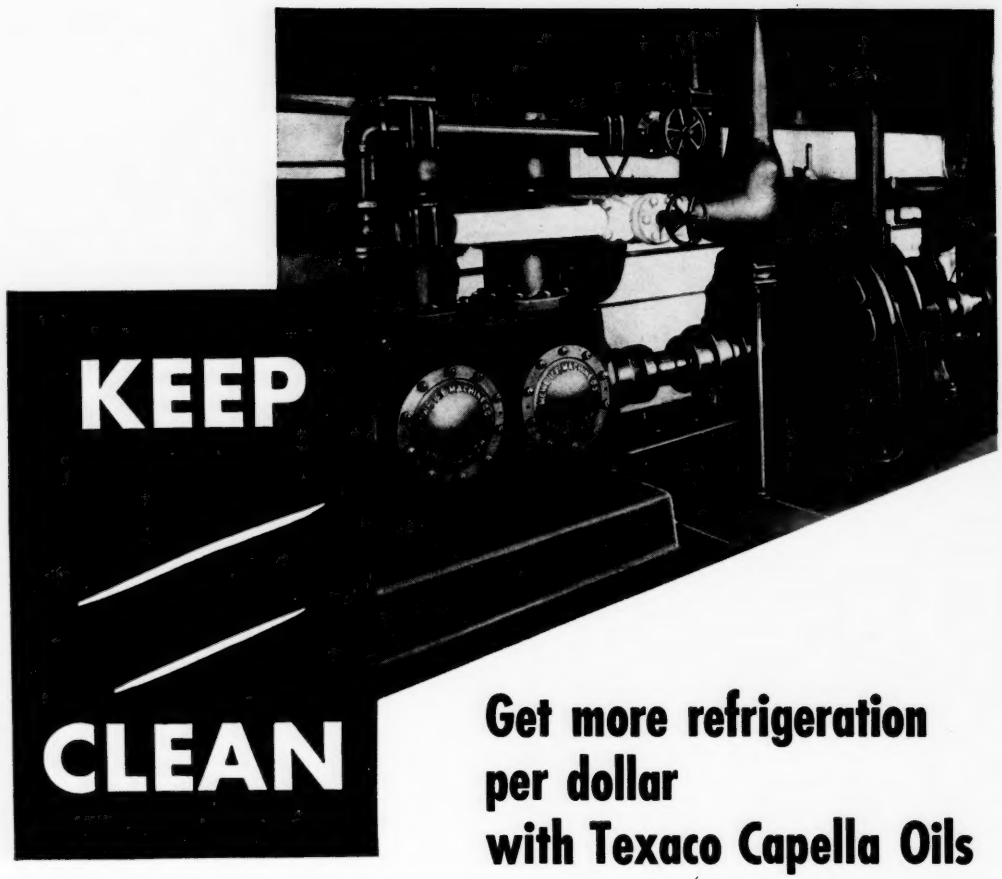
NEW YORK CITY

National Association of Practical Refrigerating Engineers **Nov. 8-11**

LAFAYETTE, IND.

PUBLISHED BY NICKERSON & COLLINS CO., CHICAGO · NEW YORK

58th YEAR ★ NOVEMBER, 1949



Get more refrigeration per dollar with Texaco Capella Oils

Cost of refrigerating and cost of compressor maintenance both come down when you lubricate with *Texaco Capella Oils*. These highly refined, moisture-free oils, with very low pour tests, assure maximum compressor efficiency and trouble-free operation.

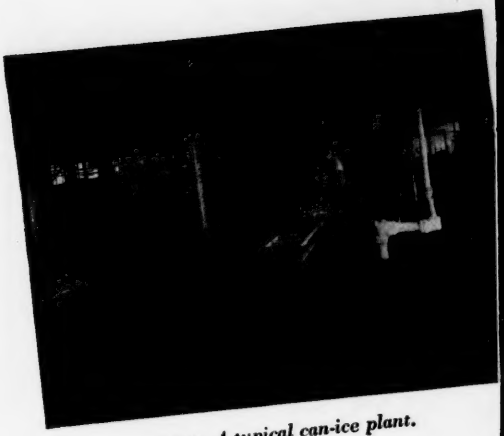
Texaco Capella Oils resist the formation of carbon, gum and sludge, thus compressors stay clean . . . rings free, valves active. In addition, *Texaco Capella Oils* do not react with refrigerants . . . coils stay clean.

To get more refrigeration per dollar, use the *Texaco Capella Oils* recommended for your particular compressors and operating conditions. A Texaco Lubrication Engineer will gladly assist you.

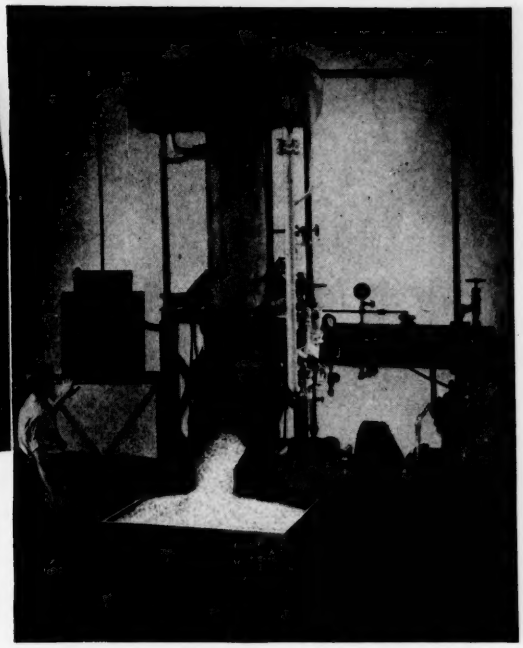
Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, New York.

TEXACO Capella Oils

FOR ALL AIR CONDITIONING AND REFRIGERATING EQUIPMENT



YESTERDAY: *A typical can-ice plant.*



TODAY: *A typical Vogtice plant. It occupies only 10% of the area required by a can-ice plant of equal capacity.*

Times have changed in ICE MAKING

MORE Ice from LESS Plant . . . that's the story of Vogtice* and the modern Tube-Ice Machine!

Employing direct expansion of the refrigerant, the *Automatic* Tube-Ice Machine eliminates brine tanks, brine circulators, ice cans, can fillers, dip tanks, dumpers, cranes, cubers and crushers, together with the power, labor and maintenance for such equipment, common to other systems.

Yes, times have changed Mr. Ice Manufacturer . . . and it's time now to modernize with Vogtice* and avoid the high cost production methods of yesterday.

WRITE FOR BULLETIN TI-3 ⟶

A complete description of the Vogt Automatic Tube-Ice Machine, the process and the product, Vogtice, will be found in this booklet, together with applications in varied fields of food production and distribution.

**Vogtice*, frozen inside tubes of small diameter, is a clear hard ice of superior quality. Either cylinder or crushed ice may be had from the same freezer by simple adjustment.*

MAKE IT PAY THE VOGTICE WAY

Vogt AUTOMATIC TUBE-ICE MACHINE

PATENT NUMBERS 2,200,424, 2,228,254, 2,398,308, 2,444,514, 2,453,140.

HENRY VOGT MACHINE CO., INC., LOUISVILLE 10, KY.

BRANCH OFFICES: NEW YORK • PHILADELPHIA • CLEVELAND • CHICAGO • ST. LOUIS • DALLAS

Produced By

MARTOCELLO

CLEAR RAW WATER AERATING SYSTEMS

MARTOCELLO AIR SYSTEMS have been producing Quality Ice for over thirty years, and their popularity is still growing today. From the largest to the smallest Ice Plant owner the MARTOCELLO name stands out in Quality, Economy and Service.

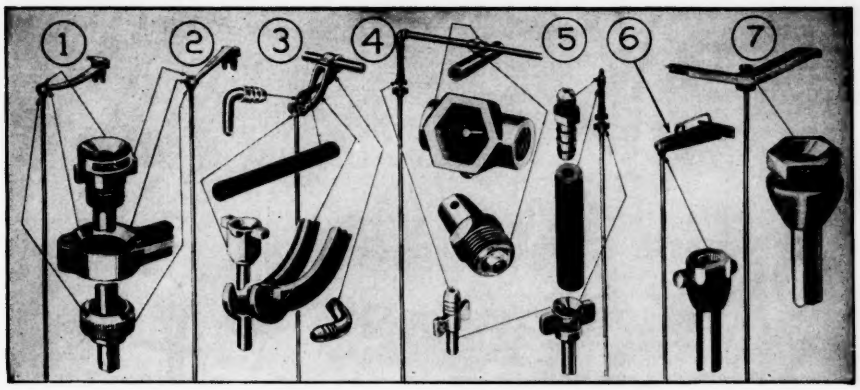
PUT YOUR DOLLAR TO WORK BY INVESTING IN A SURE THING!

All MARTOCELLO products are guaranteed to give you top performance and positive results. You will notice the superiority in MARTOCELLO products at once. We invite you to send us your inquiries and comments. Let us quote you on a complete Air System for your plant. This service is extended to you without obligation.

DON'T TAKE A GAMBLE!

Bet On "MARTOCELLO"

for the finest Air Agitation Systems



- **Quality**
- **Economy**
- **Service**

THE ILLUSTRATION ABOVE SHOWS THE FOLLOWING CLEAR ICE MAKING SYSTEMS

1. MARTOCELLO SELF-CENTERING DROP TUBE BRACKET, Offset Form
2. MARTOCELLO SELF-CENTERING DROP TUBE BRACKET, Straight Form
3. MARTOCELLO SERIES DROP TUBE BRACKET
4. DOUBLE BRACKET SYSTEM ASSEMBLY
5. SERIES DROP TUBE ASSEMBLY
6. GALVANIZED STEEL TRUNNION TYPE BRACKET ASSEMBLY
7. GALVANIZED STEEL SADDLE BRACKET ASSEMBLY

A Complete Line of Ice Plant Equipment and Supplies

FOR PROMPT EFFICIENT SERVICE — PHONE, WIRE OR WRITE TODAY!

Represented on the West Coast by Western Ice Equipment Co., 420 Market St., San Francisco, Calif.

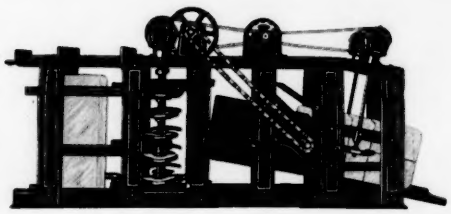
Jos. A. Martocello & Co. 229-231 NORTH 13th STREET PHILADELPHIA 7, PA.

"Serving the Ice Industry Since 1916"... "There is no Substitute for MARTOCELLO QUALITY"

★ Perfection A MODEL FOR EVERY REQUIREMENT ★

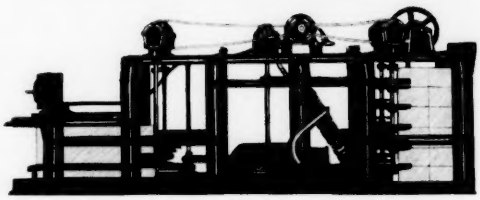
PERFECTION REGULAR

The Perfection REGULAR receives the ice block standing on end, scoring it crosswise first. Then the block enters the tilting cage which turns the block down and it slides by gravity through another set of saws that score it lengthwise. In one operation the REGULAR will score the blocks into any size pieces desired. This machine in 300 and 400 pound size, is 31 inches wide with saw guards in place, or 26 inches wide with saw guards removed. Capacity is six blocks per minute or 360 blocks per hour.



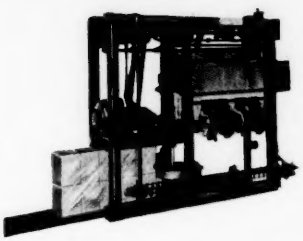
PERFECTION SPECIAL

The PERFECTION SPECIAL receives ice blocks on edge, scores them lengthwise first. Then heads up the blocks, scores them crosswise and discharges them standing on end. This is a combined heading and scoring machine and scores the blocks into any size pieces desired in one complete operation. Capacity is 4½ blocks per minute or 270 blocks per hour.



PERFECTION "MILLER"

The MILLER machine receives the ice block lengthwise on edge. It is first lifted up and scored crosswise, passing the same saws again on the way down. It is then (without leaving the machine) automatically conveyed through the saws which score it lengthwise. Only one operation is necessary for complete scoring. Block is put through machine only once. The capacity is six blocks per minute, or with 300 lb. blocks, over 50 tons per hour. With 400 lb. blocks this output is increased to 65 tons per hour.



PERFECTION ICE CHUTE

A Perfection Ice Chute offers progressive ice merchandisers the surest way to give such service. Just pull a lever, out comes a cake of ice. The job is done in one-tenth of the time required under old methods. Customers are pleased. . . . Costly refrigeration is saved. . . . Business is increased. . . . Profits multiplied. The ice chute is built in two types; the straight chute, and the parallel.

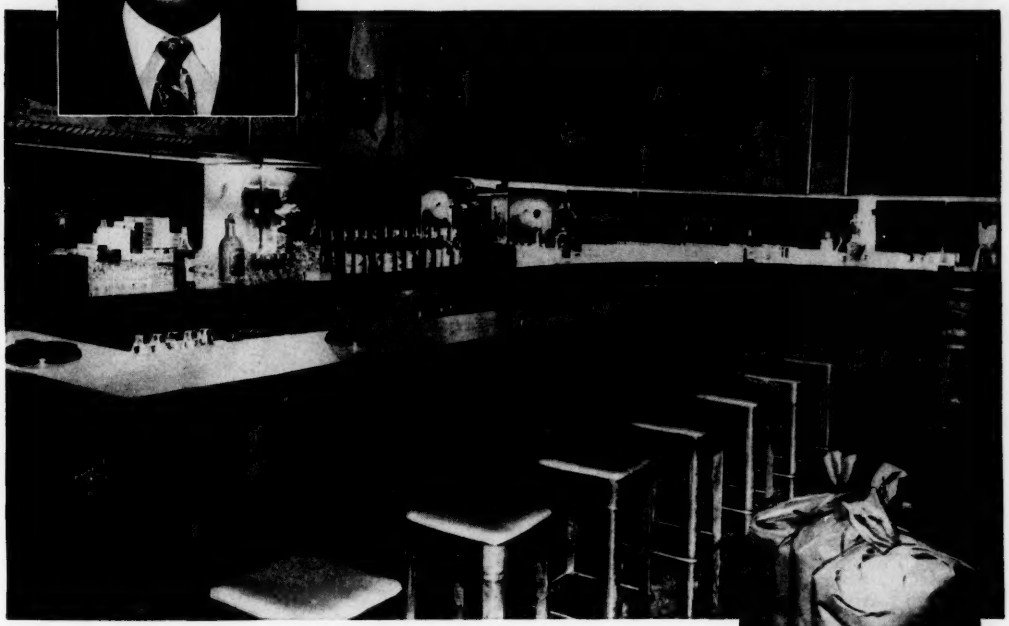
The Old Reliable Perfections have been known for their rugged dependability and long life for more than two decades.

Repair parts for all current models available for immediate shipment.

WRITE FOR MORE INFORMATION

"For absolute purity we use Packaged Processed Ice"

SAYS BERNARD GARFINKEL, MANAGER OPERA BUFFET, CIVIC OPERA BLDG., CHICAGO, ILL.



The Opera Buffet of the Chicago Civic Opera Building is one of Chicago's finest after-the-show refreshment spots—a rendezvous for celebrities.

Try This 3-Month Test To Build Processed Ice Sales

YES, the one-trip paper ice bag is a proved sales builder for processed ice. Use it for three months . . . and you'll agree. It's just what your customers—and those you'd like to call your customers—have been seeking.

The Union one-trip paper ice bag is completely sanitary. No dirt can get in, no ice can spill out! It's so easy to use that your customers actually use more ice than when it's delivered in old-fashioned re-usable containers.

One-trip paper bags speed up handling on the platform, in loading and at the delivery point. The sturdy wet-strength paper—two layers thick—retards melting. To cut your costs, to please your customers and to build your sales, switch to Union one-trip paper ice bags, and *do it now*. Write for free samples.

Wet-Strength Paper Ice Bags have tremendous strength even when soaking wet . . . thanks to a water repellent resin that binds the fibres of the paper firmly together.

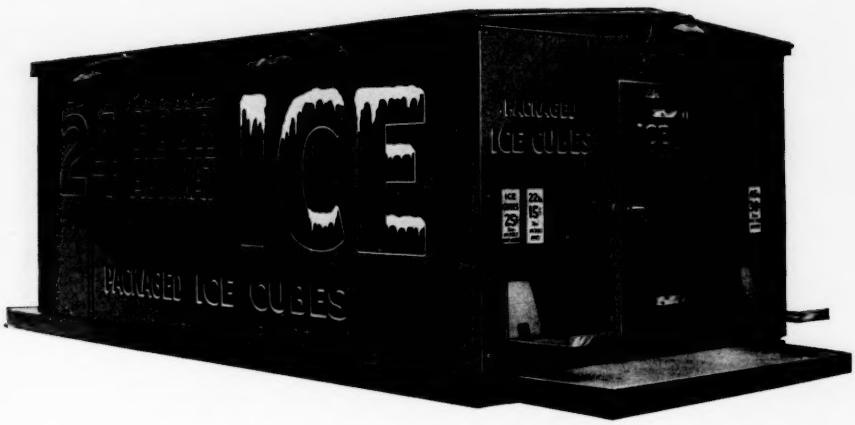
ONE TRIP

UNION Paper Ice Bags

A product of the UNION BAG & PAPER CORPORATION • Woolworth Bldg., New York 7, N. Y.

Bags of Kraft, Transparent Films, Waxed Paper, Glassine, Laminates

Another **POLAR** *Installation Selling More Ice* **AUTOMATICALLY**



Operators of Polar Aluminum Ice Vending Stations report increases in ice sales of from 25 to 50%! You, too, can depend on service-tested Polar equipment to boost your sales and profits.

A Polar Station *sells more ice automatically* by making it available in convenient locations 24 HOURS A DAY, EVERY DAY IN THE YEAR! A Polar Station vends block ice or bags of cubes. It has ample storage space and operates economically. Zero temperature guaranteed at 95° outside temperature.

NOW is the time to investigate the profit possibilities of merchandising ice the Polar way for more ice sales . . . for more ice profits, at LOWER DISTRIBUTION COSTS! WRITE TODAY FOR COMPLETE INFORMATION.

Visit us at Booth #38 at the National Convention in New York, Nov. 15-18th.

REFRIGERATION ENGINEERING COMPANY
211 Foshay Tower, Minneapolis 2, Minn.

Send me your 1950 catalog on POLAR ice vending stations

Name_____

Address_____

_____

POLAR ICE VENDING STATIONS—

***FIRST* with aluminum construction**
***FIRST* with coin accumulator**
***FIRST* with automatic electric defrost**

We will continue to pioneer new developments in automatic ice vending and will incorporate new improvements in our standard line of Polar Stations and vendors. The 1950 line of Polar Equipment features many "extras" now available to you at no extra cost.

NEW! THE POLAR JUNIOR ICE VENDING STATION. Completely assembled at our factory, it is shipped on skids ready to be put into operation on arrival at your location. The Polar Junior Station comes equipped with vendors and features the same high quality construction as the Deluxe Sectional Models. Write for literature.

REFRIGERATION ENGINEERING CO.

211 Foshay Tower, Minneapolis 2, Minn.

"BUTCHER BOY" is the preferred cold storage door of the industry, because it has ALWAYS met every conceivable challenge of hard usage. The strong, massive construction of Butcher Boy doors is the result of "controlled quality" production — a guarantee that they will meet every rigid test of required performance.

Time tested heavy duty hardware applications, PLUS prime insulation, PLUS 100% Douglas Fir Construction is a resultant product equalled by none — BUTCHER BOY. Write for free bulletins today.

VESTIBULE-TYPE TRACK DOOR

BUTCHER BOY COLD STORAGE DOOR CO.

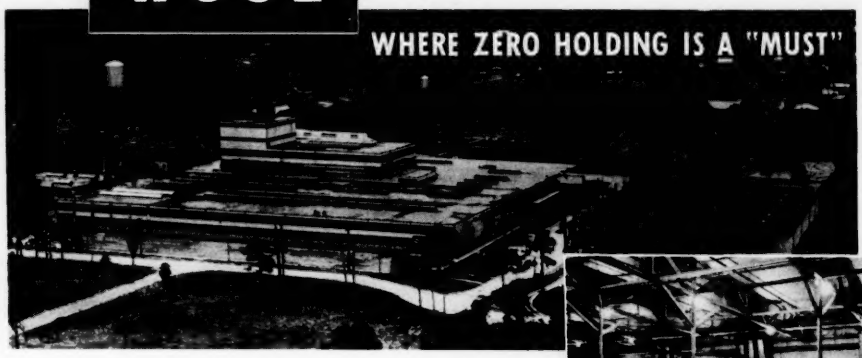
170 N. SANGAMON ST., CHICAGO 7, U. S. A.

CITRUS CONCENTRATES DEPEND ON

PALCO INSULATION WOOL

Juice Industries, Inc. plant at Dunedin, Florida, built to produce "Sno-Crop" brand orange, grapefruit, and grape juices in the new frozen concentrate form. Marketing is handled through Sno-Crop Marketers, Inc. 175 tons of PALCO WOOL were used to insulate two large storage rooms and two freezers.

WHERE ZERO HOLDING IS A "MUST"



One of two large zero storage rooms gaining maximum operating efficiency through use of PALCO WOOL INSULATION.

BETWEEN tree and table, accurate temperature control is vitally important to the new frozen juice industry. In the new processes for low temperature concentration of orange and other fruit juices, water is extracted so rapidly and at such low temperatures that flavor remains virtually unchanged. After slush freezing at 17°, juice is canned and then hardened and held at 0° through storage or shipment. Uniformly low thermal conductivity of PALCO WOOL INSULATION is a major factor both in maintaining these critical temperatures and in reducing operating costs. The ideal low temperature insulation, PALCO WOOL, is moisture resistant, odorless and odor-proof, non-settling, flame-proof, durable, vermin-repellent — and exceptionally low in cost.

Efficient quick freezing is aided by PALCO WOOL INSULATION at the Juice Industries, Inc., plant.

Write today for the PALCO WOOL COLD STORAGE MANUAL *or the* LOCKER PLANT PLAN *and* CONSTRUCTION MANUAL.

FLAMEPROOF INSULATION FROM DURABLE REDWOOD BARK

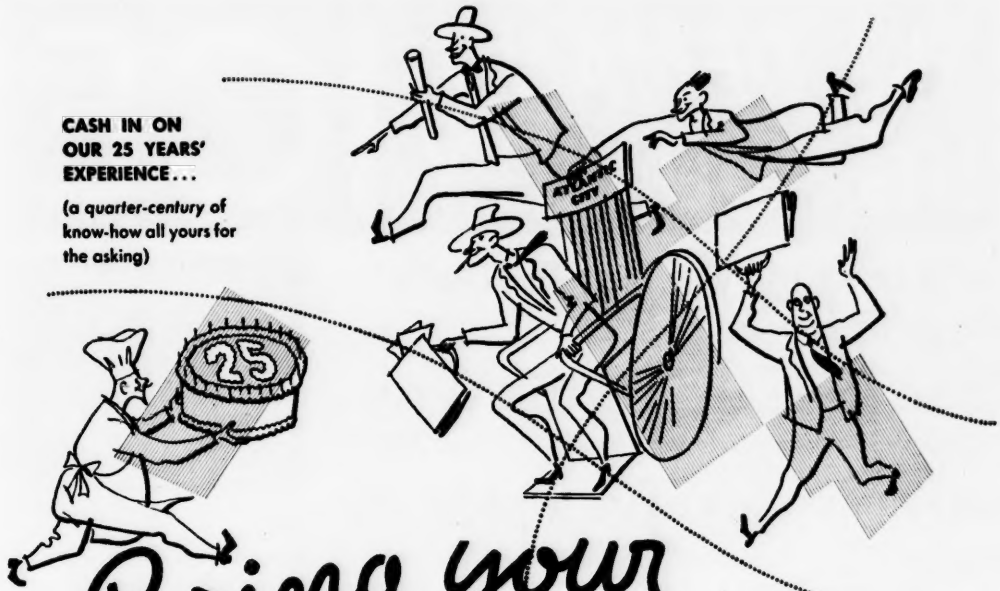
THE PACIFIC LUMBER COMPANY

100 BUSH STREET, SAN FRANCISCO 4, CALIFORNIA

3225 WILSHIRE BLVD., LOS ANGELES 36, CALIF. • 35 E. WACKER DR., CHICAGO 1, ILL.

CASH IN ON OUR 25 YEARS' EXPERIENCE...

(a *quarter-century* of know-how all yours for the asking)



Bring your refrigerant control problems to booths 422-4-6

(THE ALL-INDUSTRY SHOW, ATLANTIC CITY, NOV. 14-18)

GO INTO A HUDDLE WITH OUR ENGINEERS...
(some of the best brains in the industry)

3953

ALCO VALVE CO.

835 KINGSLAND AVE. • ST. LOUIS 5, MO.

Designers and Manufacturers of Thermostatic Expansion Valves; Evaporator Pressure Regulators; Solenoid Valves; Float Valves; Float Switches.

The *DEMAND* Is for QUALITY ICE

For Ice That Will Not Produce Slime In Ice Boxes...

Use DISTILEX This Way...

Dispense with Soda Ash, Sodium Aluminate, Alum and Similar Products . . . and

SIMPLY MIX DISTILEX WITH THE LIME YOU ARE NOW USING!

Block on left treated with Distilex, only one core emptied. Right, untreated water, cores were emptied twice. Most Distilex users do not empty cores at all.

RESULT . . . . High-grade Crystal Ice from raw water . . . Ice free from slime and deposits . . . Ice without color, odor, taste . . . Ice which can be produced at very low temperature* with no cracking while being frozen, dumped or cut.

***DISTILEX** treated water can make ice in LESS THAN 35 HOURS at 10° brine temperature!

Test DISTILEX in your plant. If not entirely satisfied, purchase price will be refunded on all DISTILEX returned. $25.00 per 100 lbs., f.o.b. Birmingham.

Use SOLVEX for COMPRESSOR COOLING SYSTEMS

HIGH HEAD PRESSURES QUICKLY LOWERED with this remarkable chemical. SOLVEX can be quickly applied without breaking a joint. REMOVES RUST, SCALE, ALGAE, OIL AND ENCRUSTING MATTER from condenser tubes and water jackets in one to five days operation. Ideal for cleaning scale and corrosion from boilers, heaters and tanks.

An effective conditioner for spray ponds and cooling towers. SOLVEX goes to work immediately WITHOUT COSTLY SHUTDOWNS. Cooling efficiency is rapidly restored by using one pound per 10 gallons of waier.

Write NOW for Further Particulars on These MONEY-SAVING AIDS TO BETTER ICE MAKING!

The CSCO STABLEIZER MAINTAINS GOOD BRINE by a positive reaction to either OVER-ACIDITY or OVER-ALKALINITY!

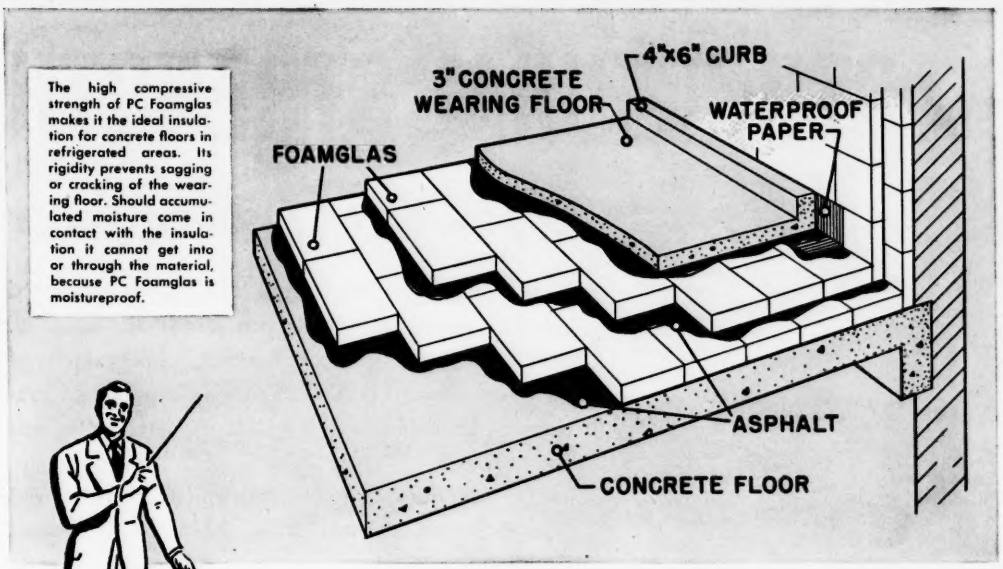
A scientific combination of pure metals upon which damaging materials in brine will "feed" in preference to the brine tank or ice cans, thereby SAVING them!

the CSCO STABLEIZER removes destructive material from the brine without adding harmful chemicals. Easily installed in all systems. No other brine treatment compares in SAFETY! The STABLEIZER does not make brine harmful to workmen's hands. PROTECTS AND PRESERVES EXPENSIVE EQUIPMENT!

CHEMICAL SOLVENT COMPANY

3005—16th Street North — Birmingham, Ala.

The high compressive strength of PC Foamglas makes it the ideal insulation for concrete floors in refrigerated areas. Its rigidity prevents sagging or cracking of the wearing floor. Should accumulated moisture come in contact with the insulation it cannot get into or through the material, because PC Foamglas is moistureproof.



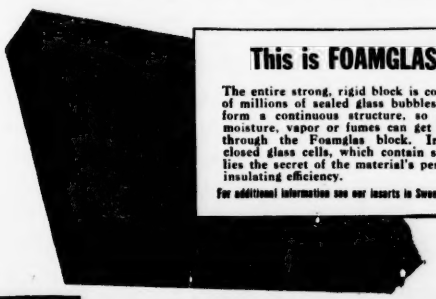
Keeping temperatures . . . and costs . . . low . . . with this permanent insulation

● The cost of refrigeration can be seriously affected by insulating materials. If they ice up, pack down, rot, shrink or swell, they can cause costly operating failures, repairs and replacements that send costs sky-high.

These things cannot happen when you install PC Foamglas insulation. No moisture, vapor or fumes can penetrate this cellular glass material, so it never contains anything that can freeze. The big, rigid blocks become an integral part of walls, floors and roofs in which they are installed, so vibration cannot shake them out of place.

Being true glass, PC Foamglas also is fireproof, acidproof and verminproof. Hence, when installed according to our specifications for recommended applications, it retains its original insulating efficiency *permanently*.

Why not send for a sample of the material and our new folder which gives authoritative information on the use of PC Foamglas insulation for refrigerated space? Just send in the convenient coupon and we shall be glad to forward your *free* copy.



This is FOAMGLAS®

The entire strong, rigid block is composed of millions of sealed glass bubbles. They form a continuous structure, so no air, moisture, vapor or fumes can get into or through the Foamglas block. In those closed glass cells, which contain still air, lies the secret of the material's permanent insulating efficiency.

For additional information see our inserts in Sweet's Catalogs

Pittsburgh Corning Corporation
Dept. Y-119, 307 Fourth Avenue
Pittsburgh 22, Pa.

Pease send me without obligation, a free sample of PC Foamglas and your FREE folder on the use of PC Foamglas Insulation for refrigerated space.

Name_____

Address_____

City_____ State_____

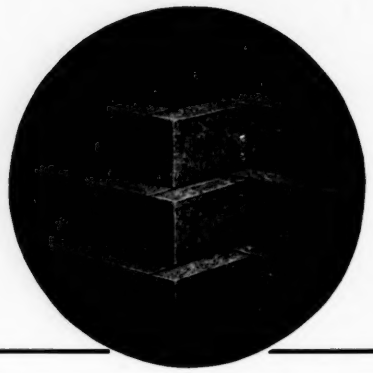
PITTSBURGH PC CORNING

FOAMGLAS INSULATION

. . . when you insulate with FOAMGLAS . . . you insulate for good!

FOR STRUCTURAL STRENGTH

Corkboard is the Choice



Section of cold room wall showing layers of Mundet Corkboard overlapped to provide barrier against heat and moisture. All joints are vapor-sealed.

The compressive qualities and resiliency of corkboard are inherent in the cellular structure of the material. Because of its strength, corkboard is an integral part of cold room construction . . . resistant to stress and vibration . . . providing a dependable barrier against heat and moisture.

This strength factor is only one of the time-proved benefits that lead to the selection of Mundet Corkboard.

The nation's largest users of refrigeration choose Mundet Corkboard for these money-saving advantages:

STRUCTURAL STABILITY The cellular structure of Mundet Corkboard maintains its shape and characteristics under rigorous conditions of service.

NON-ABSORBENCE Mundet Corkboard has no capillary attraction. This nature-made quality avoids absorption of dampness and odors. There is no swelling or loss of insulating value from moisture infiltration.

LOW CONDUCTIVITY Mundet Corkboard provides the most efficient barrier to heat transfer due to its internal cellular structure of sealed dead-air spaces.

EASE OF INSTALLATION Mundet Corkboard is light in weight despite its strength. It cuts easily, readily holds nails or skewers; bonds with cement, asphalt or paint.

LONG-LIFE There is only one way to figure insulation cost. That is the over-all 'life-expectancy' of the material. Here, again, Corkboard is the choice, with thousands of installations to prove its durable service.

●

For factual reference, write for copy of Mundet Cork Manual. In convenient filing size; contains cork specification data. Mundet Cork Corporation, Insulation Division, 7101 Tonnelle Avenue, North Bergen, New Jersey.

Mundet district offices are located in these cities:

ATLANTA
339-41 Elizabeth Street, N.E.

BOSTON
57 Regent St., North Cambridge 40

CHICAGO 16
2601 Cottage Grove Avenue

CINCINNATI 2
427 West 4th Street

DALLAS 1
505 Southland Life Annex

DETROIT 21
14401 Prairie Street

HOUSTON 1
Commerce and Palmer Streets

JACKSONVILLE 6, FLA.
800 E. Bey St.

KANSAS CITY 7, MO.
1428 St. Louis Avenue

LOS ANGELES
(Maywood)
6116 Walker Avenue

NEW ORLEANS 16
315-25 N. Front Street

PHILADELPHIA 39
856 N. 48th Street

ST. LOUIS 4
2415 South Third Street

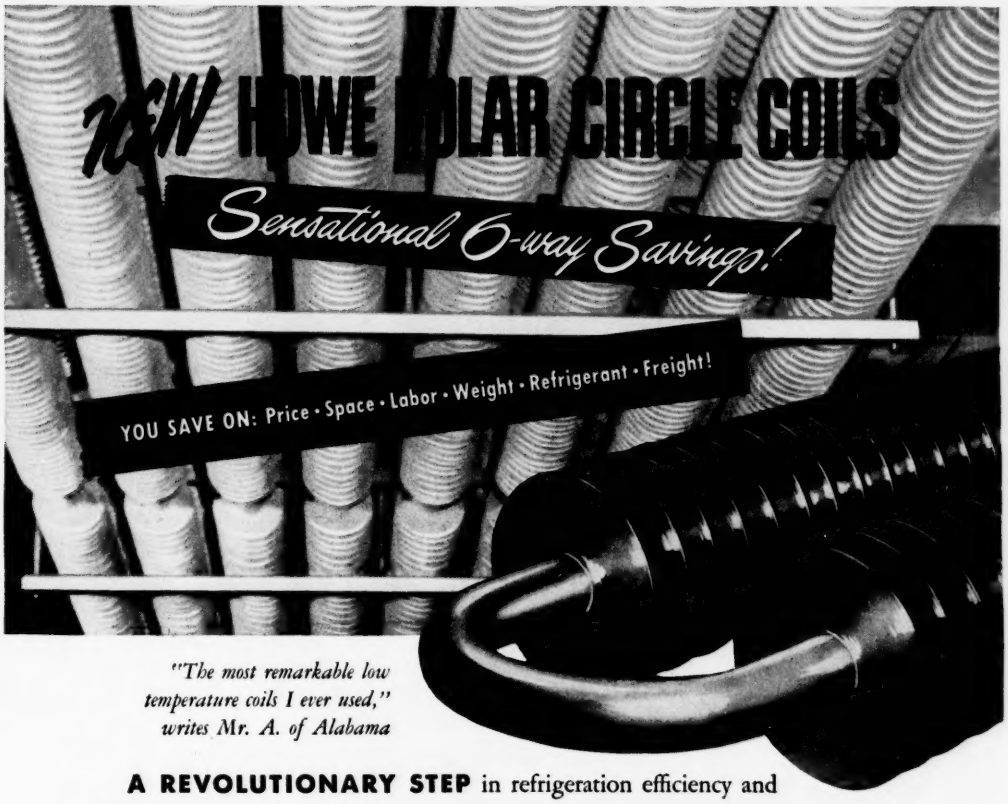
SAN FRANCISCO 7
440 Brannan Street

In Canada:
Mundet Cork & Insulation, Ltd.
35 Booth Avenue, Toronto

Write us for name of our nearest representative if there is no Mundet office in your city.

MUNDET
CORK INSULATION

CORKBOARD • CORK PIPE COVERING



"The most remarkable low temperature coils I ever used," writes Mr. A. of Alabama

A REVOLUTIONARY STEP in refrigeration efficiency and economy. Perfect for meat packers, quick freezing plants, cold storage plants, ice plants, ice cream plants. These amazing new HOWE POLAR CIRCLE COILS are built for heavy duty use in both coolers and freezers. Provide greatly improved refrigeration that assures better product control. Developed out of Howe's 37 years of specializing in refrigeration problems. *Proved* by on-the-job testing! Big Savings in all six ways over bare pipe coils!

IMMEDIATE DELIVERY—*WRITE FOR DETAILS*

***FOR ALL REFRIGERATION PROBLEMS** consult Howe, since 1912 manufacturers of ammonia compressors, condensers, coolers, fin coils, locker freezing units, air conditioning (cooling) equipment.*

AVAILABLE—A few territories for new Distributors. Your inquiry will receive our prompt answer.

OZITE
INSULATING FELT

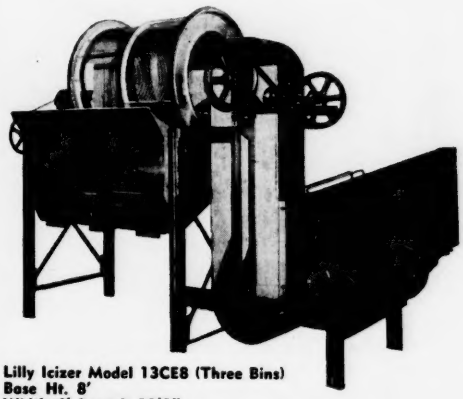
For over 50 years, all-hair OZITE insulating felt has set the pace for efficiency in cutting power costs . . . stopping heat losses, and providing low-temperature control.

You can get all the facts by requesting Bulletin No. 300 — send for a copy today.

100% HAIR FELT
LASTS A LIFETIME
EASILY INSTALLED
APPLIES WITHOUT WASTE

Write for Bulletin No. 300 Today!

AMERICAN HAIR & FELT COMPANY
Dept. L911 Merchandise Mart, Chicago 54, Illinois



Lilly Icizer Model 13CE8 (Three Bins)
Base Ht. 8'
Width 4' Length 11'3".
Capacity: 12-15 tons per hour.

See Lilly ICIZERS
on Display at
NAII CONVENTION
Booths 44-45-46-47
Commodore Hotel
New York, Nov. 15 - 18

CUSTOMER-WISE and PROFIT-WISE

When you give a customer what he wants, you are customer wise.

When you can produce this commodity at an economical rate and obtain a premium price for it, that means profit—any way you look at it.

A Lilly ICIZER will produce sized ice economically in the sizes your customer wants it. Ask the most progressive ice man you know.

BE PROFIT-WISE—
Investigate Lilly today.

Write for ICIZER Cat. No. 300

PROMPT SERVICE ON YOUR ORDERS FOR ICE PLANT EQUIPMENT AND SUPPLIES

CRUSHERS
SCORING MACHINES
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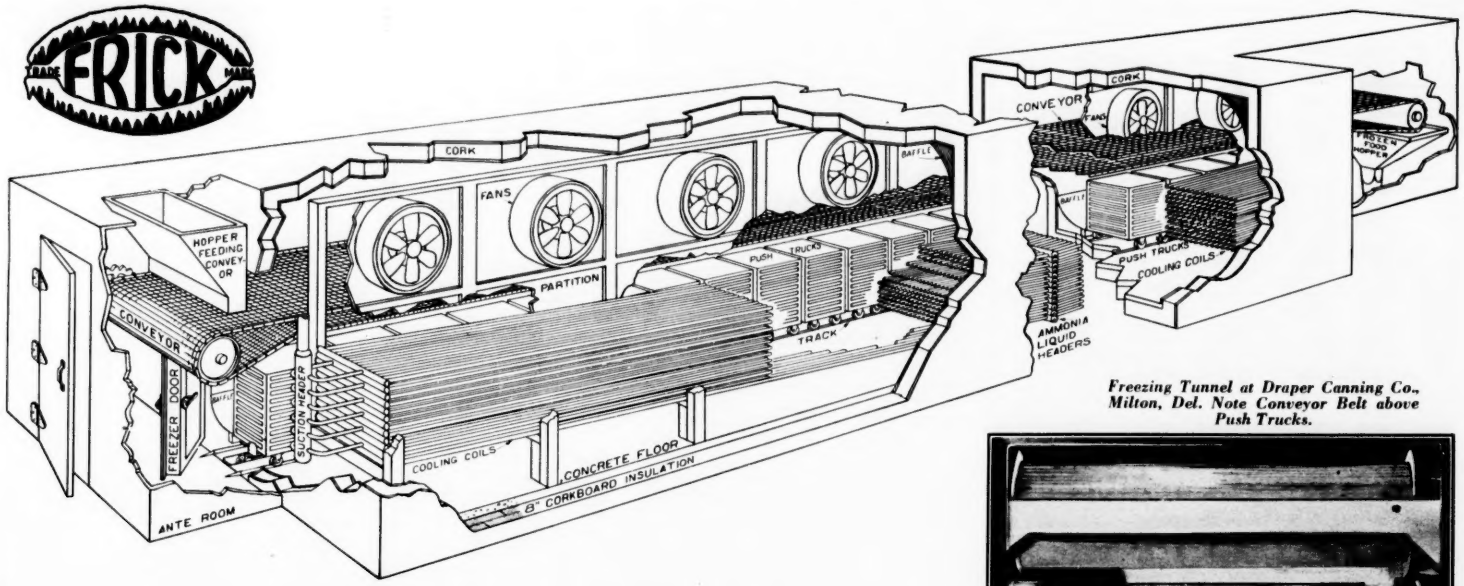
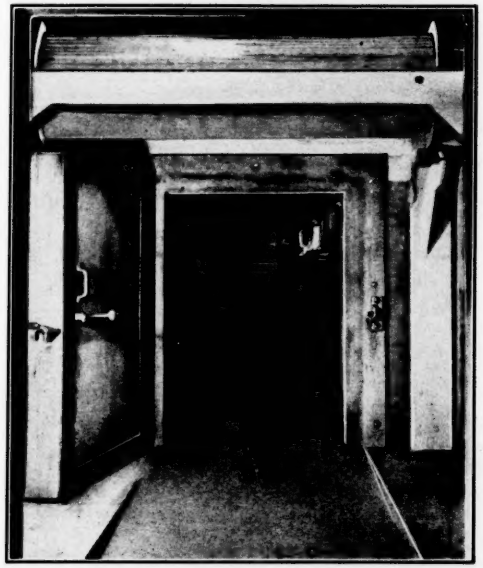


Freezing Tunnel at Draper Canning Co., Milton, Del. Note Conveyor Belt above Push Trucks.



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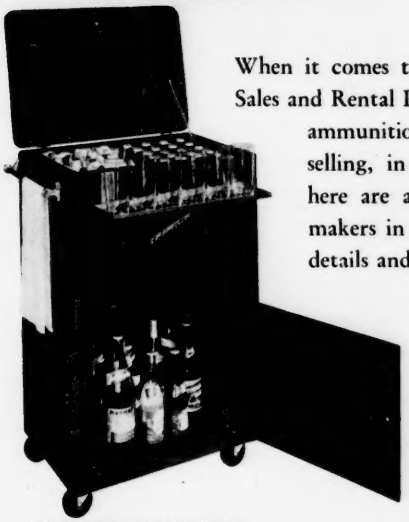

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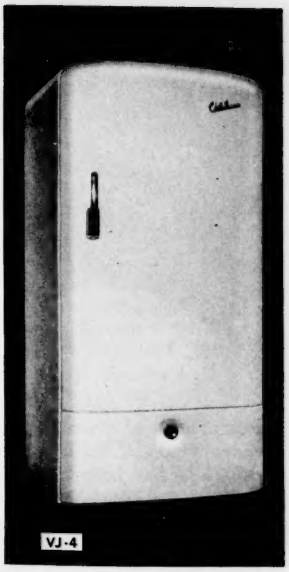
. . . And by the way . . . if you want some ideas and suggestions on rental programs, we have some you can use. Be sure to get in touch with us!



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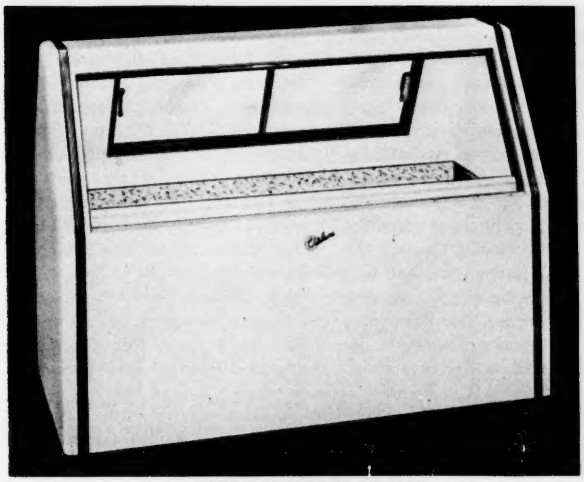

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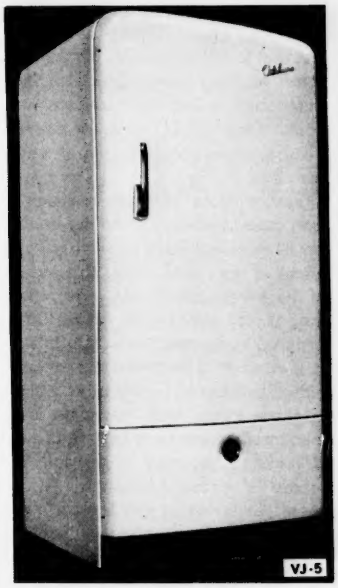

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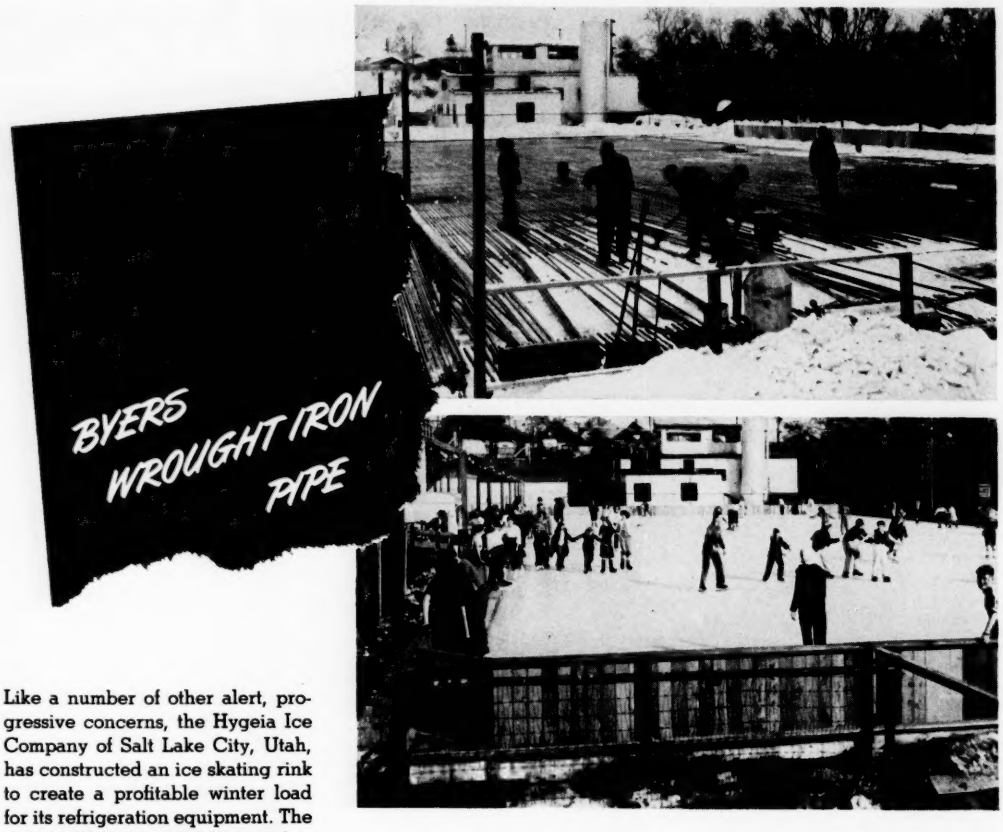

Like a number of other alert, progressive concerns, the Hygeia Ice Company of Salt Lake City, Utah, has constructed an ice skating rink to create a profitable winter load for its refrigeration equipment. The rink is 85-feet by 196-feet, and is the first of its kind in the intermountain area. Rightly recognizing that long-term profits would depend on long-lived materials, the company used wrought iron for the coils. Over 60,000 feet of Byers 1-inch wrought iron pipe was installed.

The wisdom of using wrought iron coils in skating rinks has been decisively confirmed by the experiences of dozens of users. Because of the severe conditions, any pipe that is not inherently corrosion-resistant is doomed to early failure. In a number of recorded instances, difficulties have started in as little as three years, with complete replacements necessary in from 7 to 11 years. In contrast to this is the record of wrought iron pipe—26 years of service in one large rink, with 95% of the pipe re-used when the rink was rebuilt . . . 12 years of service to date of last report in another, without a single leak . . . and still other cases where wrought iron was used for replacement, and has already outlasted the original material several times over.

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If you are considering construction of a skating rink, you will find some interesting information in our bulletin, *Wrought Iron in Refrigeration, Ice Skating Rinks, and Air Conditioning Systems.* More detailed information on user experience, and on rink costs, can be obtained by communicating with the nearest District Office.

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GENERAL OFFICE: 433-435 N. Waller Ave.
Chicago 44, Ill.
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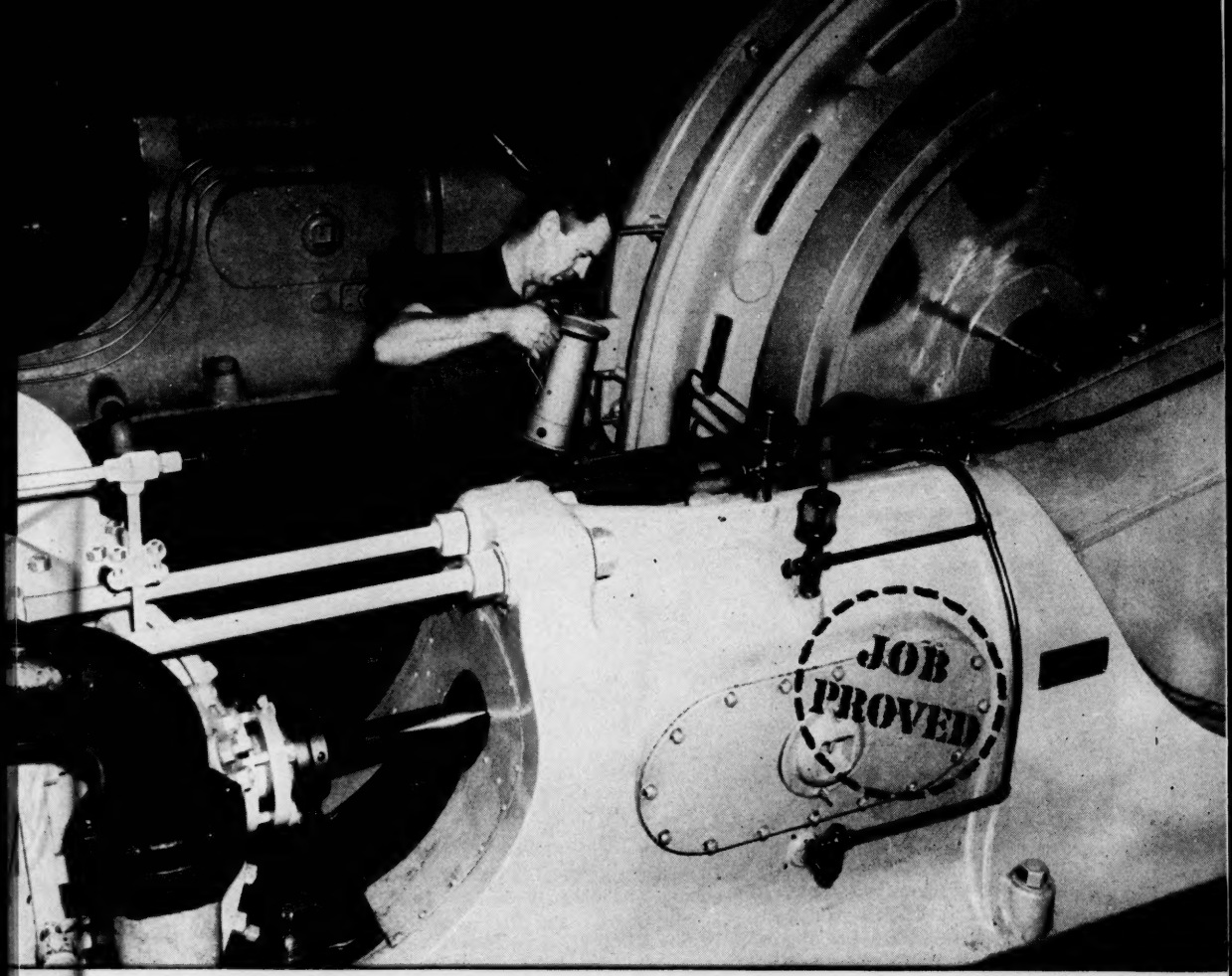

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Ten years ago, an ice manufacturer was having trouble lubricating an ammonia compressor. Valves stuck and caused loss of compression. Excessive quantities of oil were being pumped into the system.

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Such results are found wherever Suniso Refrigeration Oils are used. They are tailor-made for this industry. That is why manufacturers of refrigeration and air-conditioning equipment probably use more Suniso than the total of all other brands.

Suniso Oils are available in six different grades with extremely low pour-points and low wax-separation points. They have high dielectric strength and possess unusual resistance to chemical change when mixed with Freon or other modern refrigerants. For a copy of the 52-page illustrated bulletin "Lubrication of Refrigeration and Air-Conditioning Equipment," write Dept. IR-11.

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IN THIS ISSUE —

Research Pays Off for Ice

In an investigation at Purdue University of the different methods of handling and displaying produce in the retail store, the ice method showed great superiority. The Agricultural Extension Service of the University saw an opportunity to increase the sale of Indiana produce and aid its retailers by instructing them in the merchandising methods proved in the research at Purdue. The state and national retailers associations joined in to place a mobile training unit on a circuit in Indiana. The story of this noteworthy project is on page 25.

Cutting Costs by Standardizing Packages

Enormous progress has been made in improved packaging and the related field of materials handling. But the subject is so huge and complex that carrying it on requires inter-industry leadership and cooperation. It is suggested in an article on the subject, page 26, that something can be done about it by trade associations and technical societies.

Freezers and Storage Space Added

The Port of Tacoma has made a four-story addition to its cold storage plant, providing enlarged quick freezing service for fruits and vegetables. It is expected to serve growers within a one-hundred mile radius. Description of the new addition, with pictures, is on page 28.

National Ice Advertising

A fund of nearly $300,000 has been subscribed for the 1950 Ice Promotion Program according to an announcement made at a meeting of the Fund Raising Committee held in Chicago recently. This program has been formulated and will be presented at the annual convention in November. For further details see the article on page 38.

Higher Court Decisions

Knowledge of new and modern higher court decisions covering business law will enable companies to prepare their cases in such a way as to win unavoidable lawsuits. Some of the more important decisions involving business practices are outlined and explained in the article on page 35.

Accurate Refrigerated Storage Costs

A tested method of establishing refrigeration storage costs has been presented and explained in a series of four articles by D. O. Haynes and James Straub. The first article, on page 29, shows space calculations and the method of determining unrefrigerated space costs. Basic definitions and explanations are included. The series is well illustrated and the information will prove valuable both to those who wish to check their present methods and those who are setting up a cost system.

Locker Institute Exposition and Convention

A display of locker equipment, presentation of an advertising and publicity program, and conferences on locker processes and side lines provided basis for the exposition and convention of the Frozen Food Locker Institute held in Chicago October 3-6. See page 60 for report of the meeting.

The Reactivation of Carbon Filters

The reactivation of carbon filters used in refrigerated warehouses and air conditioning applications is a problem for which no easy solution has as yet been found. This subject is discussed in a report issued by The Research Advisory Service of Portland, Ore., in which answers are submitted by a number of authorities to a direct question as to how to do this process economically. The report is published on page 49.

Economics of Refrigeration

The refrigerating engineers of San Jose Chapter heard a good discussion of the economic side of refrigeration at a recent meeting of their chapter. Glenn Dodson analyzed the considerations involved in planning for new buildings or equipment and modernization program. He also gave facts and figures on basic industrial development and illustrated his analysis with a number of examples. The text is printed on page 51.

New Frozen Purees From Citrus Fruits

A processing method has been developed for making purees of frozen citrus fruits which retains color and flavor in the finished product and at the same time eliminates off-flavor from the high oil content. A report on results of experiments at the Research Laboratory of the Bureau of Agricultural and Industrial Chemistry, Pasadena, Calif. is published on page 63.

At the ice show...see them first

THEY'RE FIRST IN PROFITS FOR YOU!

G-W TYPE "G" SCORER
G-W 2-16-E BREAKER-ELEVATOR WITH NO. 620 PRECISION BREAKER
SEE the new Type "G" Scoring Machine which now gives you automatic scoring for the first time in a medium price unit. Just a turn of the lever starts the scoring cycle!
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INVESTIGATE the corrosion-proofed Breaker-Elevator . . . stainless steel and aluminum alloy parts give you clean, clear ice. Curved pick eliminate snow ice fines . . . all of e saleable!

ICEMEN . . . don't fail to visit G-W's display at the N.A.I.I. Convention! You CANNOT afford to miss these modern machines . . . *they're absolutely tops in profit-making ice equipment!*

Head for G-W's Booths 25 to 28 *first*. You'll see three of the FASTEST . . . LATEST . . . BEST-WORKING pieces of all-around rugged machinery that an iceman could have. Every top-grade feature, every precision built part will be on display for your inspection.

NEW bulletins on these machines and G-W's *complete* line . . . up-enders, lifter-feeders, tiering machines, breakers, conveyors . . . will be available.

NATIONAL ASSOCIATION OF ICE INDUSTRIES CONVENTION

NOVEMBER 15 THROUGH 18

REMEMBER the place . . . Hotel Commodore. Remember the dates . . . Nov. 15 through 18. REMEMBER . . . go directly to the G-W exhibit first *for full information about the latest equipment to increase your profit margin.*

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Does Ice Research Pay Off?

Indiana Ice Men Say Yes!

By Robert Walton

Executive Secretary
Indiana Association of Ice Industries
Indianapolis, Ind.

***Above:** The mobile training unit in which intensive training of produce merchandisers is carried on in the field. Sponsored by the Agricultural Extension Service, Purdue University, and the Indiana and National retail grocers associations, this project has already produced significant results in training retailers to do a better job of displaying and merchandising fresh fruits and vegetables.*

***Below:** The school for produce retailers utilizes the excellent facilities set up inside the mobile training unit. Mr. Oesterle, the instructor has set up the proper display of produce and is teaching the local retailers how to merchandise the fresh fruits and vegetables in the best possible manner.*

JUST ask any Indiana ice company executive what he thinks about Ice Research and then prepare yourself for an enthusiastic dissertation on the merits of such studies. More than likely most of his discussion will be based on the work done at Purdue University, because the benefits which have accrued from their research have been of inestimable value.

The facts to back up Indiana's convictions take the following pattern:

The first study undertaken by Purdue dealt with the use of snow ice in retaining vitamin content in fresh fruits and vegetables. The first Purdue research was one of many conducted throughout the nation in colleges and universities, and ultimately was made a part of an overall consolidated report on the use of ice in vitamin retention. These studies were then made the basis for a nationwide campaign by the National Association of Ice Industries, which extolled the virtues of ice in handling fresh fruits and vegetables.

It was felt however, that more research was needed to establish the superiority of Ice in the marketing process of fresh fruits and vegetables. So, Purdue was again called on to assist the industry. Purdue's second study involved a comparison of the various methods of retail display commonly used at the retail level. The industry as a whole was confident that the iced vegetable display was the one best method of keeping vegetables garden-fresh and vitamin-rich, but wanted an unbiased study conducted to substantiate this belief.

After many months of careful evaluation of each type display case, including the refrigerated case, the mist case, the dry rack and the ice display case, Purdue gave us the facts . . . factual information so loaded with sales appeal that overnight it became background material for iced display case merchandising programs. It would be difficult to evaluate in dollars and cents the value of this display case study, but we certainly say that the money and effort spent on the research was returned many, many times.

The above mentioned values of the Purdue Research Program can be considered direct benefits. Of equal importance are the indirect benefits from the studies. First and foremost is the interest Purdue is displaying in further ice research. Fully realizing the potentialities of ice as a valuable marketing aid for all perishables, they are forging ahead unsolicited into new fields.

Probably one of the most valuable indirect benefits of

the Purdue Research is the educational program sponsored by the National Association of Retail Grocers. Recognizing the vital need for trained produce handlers at the retail level, the National Association of Retail Grocers asked Purdue to sponsor a mobile school to conduct this training. Significantly, Purdue selected Eric Oesterle as director of the produce school. Mr. Oesterle is the graduate student who conducted the Ice Research, dealing with the comparative study of the various display cases. Equipped with a trailer to house his school he is touring the state, giving produce handlers the last word in produce protection, display and merchandising.

Mr. Oesterle has enrolled approximately 100 retail grocers in the program to date, and so far has visited Lafayette, Logansport and South Bend. He reports that in all cases he has received the utmost in cooperation from the ice companies and service produce wholesalers in these localities. The ice companies not only have furnished the snow ice used in connection with the school, but are active in solicitation of retail trainees. Mr. Oesterle is now on the road making return calls on each of the retail grocers who have attended his course. He states that he is finding these call-backs of equal importance to the produce training school since many of the grocers have individual problems which are not covered in the school. Mr. Oesterle's trailer is scheduled to go back on the road in October when he will visit other sections of Indiana.

This fall, Mr. Oesterle also plans to conduct grocer meetings in each of the areas which have been serviced by the mobile training unit. At these meetings he will use the film "Naturally Yours," as well as the sound slide lecture "Dollar Garden," produced by the National Association of Retail Grocers. Adding to these meetings, Purdue has a host of good speakers available, who are to help tie in the Produce Merchandising Program with the General Purdue Extension Program as a whole.

The mobile training unit will be on display in Washington, D. C. on November 10 to 17 in connection with the Industrial Exhibit of the Trailer Coach Association, at which time the National Association of Ice Industries is to cooperate with Purdue in furnishing ice and produce for the trailer. During the same time that the trailer is on exhibition in Washington, Dr. Hauch of the U. S. Department of Agriculture is going to conduct a workshop for extension workers connected with the retailing of fresh produce. Mr. Oesterle states that he feels this project is a "natural" for the extension service and that other states will readily adapt it in their own programs.

Naturally all these fine things Purdue has done and is doing did not develop over night. The research ideas fostered by the Research Department of the National Association of Ice Industries and its committee lie in the background. The valuable contacts made by the Research Department and constant follow-up made on these projects is largely responsible for the singular success of the Purdue Research. The results of the industry research studies is proof positive of the vital importance of well-planned, effective research in the Ice Industry.

Standardization Can Cut Package Costs

By H. C. Diehl

Director and Secretary, The Refrigeration Research Foundation

TECHNOLOGICALLY the subject of packaging is vastly complex. We don't need to dwell on that. It is so complex that any talk about standardization—any approach to the subject that might lead toward inter-industry conferences and ultimate agreements and progress on such matters as size, shape, strength, and other characteristics—may seem hopeless at the beginning.

And yet, when we cast about for ways and means of cutting costs, increasing volumes of sales, and in general strengthening the overall structure of American industry, it becomes increasingly obvious that industrial groups can get together profitably in sessions where they face the technological facts, bring new and old facts together, and set about grasping opportunities to benefit by use of those facts.

Let it be understood at the beginning that I am not a specialized packaging scientist, nor could I qualify as a technical packaging consultant. If I were entrusted with the responsibility of purchasing and engineering a hundred thousand dollars worth of packaging a year, I would be extremely puzzled, to say the least.

On the other hand, I have spent a number of years as a food scientist, and in recent years I have directed research for the refrigerated-storage industry of America. Looking back I am impressed by the number of times those groups—food packers and warehousemen—have expressed their intense interest in packaging and handling problems. And they have too often lacked a mode of action, in collaboration with other groups, whereby that interest could expand itself in mutually benefical action.

First of all I want to call attention to the enormous and exciting progress that our industrialists and scientists have made in packaging and the intimately related field that we call materials handling. Developments have been tremendous—but let's remember that big developments always require continuing big operations. Size carries proportionate responsibilities. The sheer extent, range, and complexity of the packaging and materials-handling fields simply mean that we are in the midst of an era—a new one—with portents and omens but with few clearly developed, adequately understood trends, and with conspicuous opportunities for broad-gauged, forceful, inter-industry leadership.

Specialized Achievements

Some of the specialized achievements require mention here. Our metal and glass (hermetically sealable) containers are wonders of modern times. Materials for nonrigid packaging are numerous and possess a wide range of excellent capabilities. Packaging machinery is an amazing result of modern industrial engineering. Of handling equipment we have an extraordinary range of types, and excellent quality. At the national materials handling conference, thousands of square feet of space are required to exhibit available equipment.

All of these facts help us to comprehend our present position. What these achievements are coming to mean is also beginning to be apparent. Recently we have read of a shipment of glass-packed goods by steamship in

which complete palletization saved 50% of the man hours of handling. Not long ago the traffic manager of a large food-manufacturing firm in Canada made the statement that use of pallets in rail shipments, in his company's tests, reduced loss from damage by over 90%, and he pointed to the annual loss in damage claims in the United States of 125 million dollars. It looks as if we are on the way to substantial reduction in shipping damage.

Mechanized Handling for Refrigerated Warehouses

In the refrigerated-storage industry, several companies have recently spent hundreds of thousands of dollars to find out what they can do with fork trucks, pallets, and related equipment, and although the investigations have been costly, the results have justified the costs, many times. They have rather precisely indicated what refrigerated warehouse uses and conditions justify mechanized handling and those conditions which do not seem to warrant the adoption of such methods.

For the most part, as is no doubt to be expected, the developments in packaging and materials handling equipment have resulted from initative and research of the manufacturers of that equipment. The makers, rather than the users, have provided the compulsion, the ingenuity, and much of the know-how. Frequently the special effort has been to find the most widely applicable type of equipment—the containers and the machine that have the widest ranges of usefulness. Very often, too, users have attempted to select, from the wide range of makes and types, those that seem to meet their requirements best.

The chief source of complexity for the user, of course, is the fact that he has a given commodity which, if he understands it technically, has certain packaging requirements. In terms of maximum value to be conveyed to the consumer, that commodity—with all its chemical, physical, and, in the case of some perishable foods their biological behavior also—should supply the primary data. Research and overall development should not necessarily begin with the individual commodity, but certainly the approach from the individual commodity should receive attention—and I will add, certainly more attention than it has received.

Packaging of Fresh Foods

This approach is the more valid and the more necessary in the food industries as we accelerate our trend toward emphasis on fresh quality—toward packaging of fresh foods, frozen foods, refrigerated foods in bulk packages, and foods processed with less heating than was formerly considered necessary. In our continuing efforts to make foods more attractive—richer in natural color, texture, flavor, and nutritive values—we may seem to be running into the necessity for greater diversity and complexity—more sizes, shapes and kinds of packages than we have had before.

It is quite evident that this diversity must be faced and that we must set about getting the research that will acquaint us fully with the packaging requirements of the individual commodities. That kind of research is not however the whole requirement. On the other hand, it is equally necessary that we seek greater standardization in shipping containers — fewer classifications of sizes and shapes, greater economy in mass handling.

To mention a few matters more specifically: In the packaging material that comes in contact with the food product there is the question of the permeability to air, moisture vapor, and gaseous products that may be given off by the commodity. For fatty foods there is the question of development of rancidity and deterioration. For many foods there is the question of color and flavor changes and the effects of added flavoring substances on the packaging materials. The matter of heat transfer to and from packaged commodities which are perishable is highly important for commodities such as fresh fruits and vegetables which have to be precooled and frozen foods which must be stored, both before refrigerated storage or transport. I have mentioned only a few of the specific problems of adaptation of inner packaging material to individual commodities.

Shipping Containers

These factors also affect the outer container, but in the matter of shipping containers we also have specific problems—the problems of space economy in railroad cars and trucks, the problem of damage and claims, of uniform pallet size, of floor space and height of piling in storages. These matters are equally important and offer opportunity for millions in savings, and with savings come larger volume, greater success, and stability all round.

Responsibility for inter-industry leadership in collaboration is much more of a moot question than it ever need be. Trade associations and technical societies can do something about it. Usually they are involved in their own particular research and development problems, and must be thus involved. Before we can come to a definite understanding of individual commodity requirements in packaging, it's necessary to do a great deal of competent research.

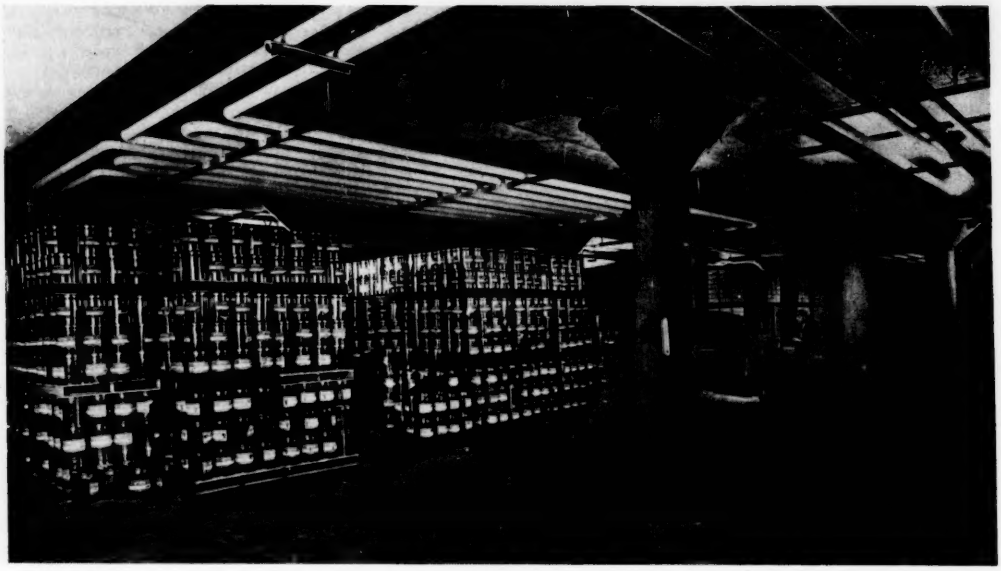
Government activity is influential. The U. S. Navy Department wants standardization in materials handling and is reported to be making helpful suggestions to the Navy Industrial Association. From a military point of view, there is a tremendous amount of common sense in the promotion of standardization in packaging and materials handling.

In Australia, I understand, a Bureau of Materials Handling, which is a part of the Ministry of Post-War Reconstruction, is engaged in special research, demonstrations, and publication of pamphlets and other information, all aimed toward development of the best and therefore the most nearly standard methods and equipment. In our own government the Department of Commerce, Section of Marketing Operations, is offering service to warehousemen and wholesalers. In the Department of Agriculture more work on packaging and handling of specific farm perishables is planned for the future because the importance of the problem in relation to reduction of wastage and losses is fully recognized.

Industry Initiative Needed

On the whole however the responsibility of government has its limitations, and it is highly desirable that industrial groups understand, first, their own needs, and second, the means by which they can accomplish improvement together. In the refrigerated-storage industry we know, for example, that packages bear a direct relationship to handling costs, because packages vary in strength, in insulating value, in relation to heat transfer, in permeability to humidity, in size, and in other respects. With inter-industry collaboration in prospect, our industry can bring its data to councils. Similarly others can do the same sort of investigation and counciling.

A beginning might well be made with a specific-commodity industry, which could bring its technical findings to conferences with package makers, with transportation and storage industries, and with wholesalers and retailers. This sort of activity is needed. In fact we must have it if our industries are to maintain their leadership and the rate of progress already attained.



One of the minus 10 F storage rooms in Port of Tacoma cold storage plant addition. Note mechanized handling of goods on pallets with fork trucks

Freezers and Freezer Storage Added to Port of Tacoma Plant

THE Port of Tacoma's four-story addition to its cold storage plant, at Tacoma, Wash., now in full operation, has made it possible to quick freeze and store the fruits and vegetables of growers within a 100-mile radius of the plant. Produce is brought to the plant by truck and rail and is shipped to markets throughout the United States. The plant is owned and operated by the Port of Tacoma.

The four-story addition, 130 by 130 feet, provides over 50,000 square feet of floor space. Two Frick compressors, direct expansion ammonia system, are installed. These can be operated in conjunction with five compressors in the older part of the plant. Nearly 1,000,000 board feet of Fiberglas insulation are employed to insulate wall and floor areas, and the roof.

The first floor of the addition is divided into three rooms, each equipped with spiral fin coils, with high pressure fans and air ducts, where temperatures of minus 20° F., can be maintained. Wall areas of the rooms are insulated with eight inches of asphalt-enclosed Fiberglas board, faced with Hex wire and Portland cement plaster. The floor areas are insulated with eight inches of Fiberglas board, over which a three-inch reinforced concrete wearing slab has been poured.

The three upper floors are also each divided into three rooms, similarly Fiberglas-insulated, and are equipped with pipe coils hung from the ceilings. Temperatures on these floors can be maintained at minus 10° F. The roof of the addition is insulated with six inches of asphalt-enclosed Fiberglas board and two inches Fiberglas roof insulation.

As a test of the operating efficiency, when the addition was ready to start operating, temperatures were brought down to minus 20° F., on the first floor, and minus 10° F., on the three upper floors. The cooling equipment was then shut off for 24 hours. During this 24-hour period the temperature rise was not more than one to two and a half degrees in any room. Outside temperatures averaged 68 to 79° F. Thermostats in each room are set with a temperature differential of one and a half to three de-

(Continued on page 64)

Installing Fiberglas asphalt-enclosed insulation board on a wall in the addition to the Port of Tacoma cold storage plant. The wall insulation is six and eight inches thick.

A Practical Solution to Accurate Refrigeration Storage Costs

Part 1 - Space Calculations and Unrefrigerated Space Cost

By

D. O. Haynes
Vice-President

James W. Straub
Manager, Accounting Dept.

Merchant Refrigerating Co., New York, N. Y.

The refrigerated warehouse industry like all others is extremely cost conscious. But the problem of determining basic costs accurately and utilizing the data to best advantage is somewhat complex. A series of four articles prepared by D. O. Haynes and James W. Straub gives a step by step analysis and describes a tested method of determining refrigeration storage costs on an accurate basis.

Mr. Haynes has been a frequent contributor to ICE AND REFRIGERATION beginning with his notable series of articles of mechanized handling of refrigerated commodities, July 1947 through April 1948. His article in the October 1949 issue "Why Not Go All Out for Standard Costs" described the advantages of the procedures detailed in the present series.

James W. Straub is a graduate of New York University where he specialized in business administration. After several years experience in accounting work, he joined the Merchants Refrigerating Co. in 1942. There he worked with Mr. Haynes in the development of a complete cost accounting system for handling and storage costs. At the conclusion of these projects he became manager of the accounting department.

WHEN "Standardization as a Basis for Rates"[1] was published back in 1921 those responsible for its preparation aimed to provide a working manual which would start the cold storage industry thinking about and using uniform methods of cost finding. Those were the days when industrial cost accounting and especially uniform cost accounting for an industry were in their infancies. Many desirable refinements had to be omitted in the interest of establishing a basic philosophy on which to build in the future. One of the principal tenets of the proposed methods was the necessity of bringing costs down to individual commodities. The system should result in a warehouseman knowing both the handling and the storage costs of each product stored.

Under the procedures outlined in this official guide, refrigeration costs as part of storage costs were segregated and distributed to cooler and freezer space on the basis of one ton of refrigeration in warm weather for 24,000 cu. ft. of cooler and for 8,000 cu. ft. of freezer space—a ratio of 3 to 1. No details are given to explain how these figures were arrived at for the warehouse used as an example throughout the text. If true commodity storage costs are to be made available, refrigeration expenses must be allocated on a more detailed basis than simply cooler and freezer space.

The methods about to be described were developed by the authors for Merchants Refrigerating Company to provide more accurate commodity costs and to give closer control over engine-room activities. No claim is made for any startling new discoveries. The procedures given are the results of considerable study to work out an organized method of storage-cost finding based on sound accounting-engineering principles. Cost figures cannot be picked out of the air. There is much tedious preliminary work to be done, but once the basic figures have been collected, their current application to cost finding is a comparatively simple matter. This series of articles will follow step by step the progress of the work from its inception until the final figures come through the accounting records. The forms required have been reduced to a minimum, but those shown are essential if accurate storage-cost figures are to result.

Merchants Refrigerating Company operates seven cold storage warehouses. Multiple plants complicate accounting procedures, especially overhead distribution. In order to simplify the present discussion, the figures given will be for a hypothetical warehouse operated as an independent unit. Furthermore, this plant is assumed to be simply a cold storage warehouse. It has no brine line service, no tenants and does not manufacture ice. Should a plant have any such sideline activities the procedures given can readily be expanded to include them.

The first step in developing a cost-finding system is to prepare a Chart of Accounts. This should cover the Balance Sheet as well as the Profit & Loss Accounts. In as much as this discussion is limited to storage costs the accounts directly involved in finding storage costs only will be considered in detail.

Storage Costs

Storage costs are composed of three elements. First, the basic cost per square-foot of unrefrigerated space. Second, the additional cost per square-foot of storage space incidental to providing refrigeration to maintain the desired temperatures in the various storage rooms. Third, the cost of refrigeration to chill or freeze commodities received at higher-than-storage-room temperatures.

This analysis of storage costs indicates that it is necessary to develop two different set of expenses—one covering the unrefrigerated aspects of storage, the other refrigeration. The accompanying Chart of Accounts covers the Storage and Refrigeration Expense Accounts only as set up for our hypothetical warehouse. The accounts are, of course, merely suggestive, because each concern will compile such a list according to the kind of information it

[1] Published by National Association of Refrigerated Warehouses.
[2] Venemann, H. G., Refrigeration Theory and Applications, Nickerson & Collins Co. Motz, W. H., Principles of Refrigeration, Nickerson & Collins Co.

seeks from its accounting records for control purposes. However, the basic principle which must be followed consistently is that those expenses which pertain to the operation and upkeep of the plant as an unrefrigerated warehouse must be classified as *storage expenses* and those incurred in maintaining storage-space temperatures and in refrigerating commodities as *refrigeration expenses*.

Chart of Accounts Storage and Refrigeration Expenses

STORAGE EXPENSES

Labor—Watchmen
Making room, transferring, etc.
Fire Alarm System
Short & Damage—Due to storage conditions
Storage Supplies
Maintenance—Storage facilities
Insurance—Compensation on labor charged to storage
Premiums on storage items
Depreciation—Building, allocated in proportion to storage, refrigeration and general offices. Storage portion charged here.
Taxes—Real estate. Allocated same as depreciation above.
Payroll on labor charged to storage.
Portion of Warehouse Overhead.

REFRIGERATION EXPENSES

Labor—Engineers, oilers, etc.
Cleaning coils.
Engine Room Supplies
Maintenance—Refrigeration facilities
Insurance—Compensation on labor charged to engine room.
Premiums on refrigeration items.
Depreciation—Building. (See basis of allocation above).
Insulation & Refrigeration Piping—Coolers
Insulation & Refrigeration Piping—Freezers
Insulation & Refrigeration Piping—Sharp Freezers
Compressors & Other Machinery, Condensing System, etc. Allocated to classes of space on basis of peak demands of each class.
Electric Power.
Fuel—Coal and oil.
Taxes—Real Estate. (See basis of allocation above).
Payroll. On labor charged to refrigeration.
Portion of Warehouse Overhead.

Even if time and space permitted, this is not the place to discuss overhead distribution. Each company will either follow the methods proposed in "Standardization as a Basis for Rates" or work out its own procedure for handling this controversial matter. In the examples given here it will be unnecessary to know how, for instance, administration and other burden accounts have been apportioned to storage and refrigeration in order to follow intelligently the methods set up for finding commodity storage rates. In most instances total figures are used and the details need not concern the reader.

Unrefrigerated Storage Costs

If the total of the items classified as storage expenses, without any refrigeration expenses, is taken for any given period, the figure represents the cost of all unrefrigerated space during that interval of time. How is this figure to be reduced to a unit basis?

There are several different kinds of "space". Should storage costs be calculated on a square-foot or a cubic-foot basis? Either will do, but the former is the simpler to calculate because overhead obstructions in storage rooms—piping, ducts, projecting beams, sprinkler systems, etc. complicate the measurements for cubic-foot determinations. As intimated above, we have settled on the square-foot basis.

The next question is to decide which of the following "spaces" to use in our calculations.

Gross space is the area found by using the outside dimensions of a room including the area occupied by outside walls and half the area of a wall between it and an adjacent room.

Available space is the area found by using the dimensions of a room between the walls, less the space occupied by stairways, elevators, columns and similar structural features, as well as by blowers and other equipment which take up floor space.

Net available or occupiable space is the available space less aisles and other work areas.

Although it is initially difficult to determine and is subject to change should aisles be rearranged, occupiable space is the most equitable one to use for cost purposes because it is the space on which merchandise can actually be piled. It is the revenue-producing space of a warehouse. Its use as a basis also means that the cost of unoccupiable space is absorbed so that when the space occupied by a given commodity is determined from well-developed pile data the figure does not have to be increased to include its share of aisle and other unoccupiable space.

In working up the basic figures to be used in cost finding it is essential to keep the information collected in an orderly manner. When this is done much time is saved currently and later, should questions arise or modifications have to be made, the working papers will be available. Form I is designed for the purpose of collecting essential data for a room. The figures in the sample shown are for one of the rooms in our hypothetical house. For the moment we are concerned with the information listed on the left-hand side. Later, we shall see how the data at the right are used. The reader will readily follow the way the different areas have been calculated in order to find the occupiable area of the room.

Handling Storage Expenses

Having established the physical basis for storage costs we are ready to take up the dollars-and-cents part of the picture. The most satisfactory way to handle storage expenses is on a standard, or as it is more aptly called, budgeted basis. Most storage expenses can be accurately anticipated for a year, certainly for six months and with a schedule drawn up for any selected period the monthly figures are easily set up. Without going into details it can be said that the actual expenses for a given period are compared currently with the budgeted amounts and the differences carried in an over-and-underabsorbed expense account. One of the helpful advantages of this method is that during a six-month or other chosen interval a uniform unrefrigerated storage cost is used. When actual expenses are the basis of current figures the costs fluctuate considerably from month to month. Budgeted figures spread these variations.

We shall assume that the management of this particular plant has established budgeted costs and that the total monthly unrefrigerated storage costs, including overheads amounts to $16,250.00. Meantime, we have found, by adding all the occupiable spaces of the various rooms that the total for the plant is 123,400 sq. ft. The monthly cost per occupiable-square-foot of unrefrigerated space, is therefore, 13.17 cents. This figure must now be increased to include refrigeration expenses. Our next move is, therefore, to follow the procedures necessary to distribute refrigeration expenses to coolers, freezers, sharp freezers and commodities.

ROOM DATA SHEET

ROOM B4 COMPANY

AVERAGE TEMP. 30 °F LOCATION

GROSS AREAS: Outside building dimensions, and ½ of thickness of Common Walls. UNAVAILABLE AREAS include the thickness of all insulation. Purpose of below to arrive at NET STORAGE AREA.

AREAS	DIMENSIONS (In feet and decimals) LENGTH	WIDTH OR THICKNESS OR DIAMETER	AREA (Sq.Ft. & Decimal)
GROSS AREA: Including Outside Walls of Building.			
ROOM	180.0	60.0	10,800.00
UNAVAILABLE AREAS: Include Insulation on Walls.			
NORTH WALL	180.00	1.08	194.40
SOUTH WALL	180.00	.34	61.20
EAST WALL	58.59	1.08	63.28
WEST WALL	58.59	1.08	63.28
PARTITIONS	None		
STAIRWAYS	Outside		
ELEVATORS	43.67	8.67	378.62
COLUMNS			
16 @		2.17 diam	59.20
14 @	2.17	1.33	40.46
8 @	2.17	.67	11.60
TOTAL UNAVAILABLE AREAS			872.04
UNOCCUPIABLE AREAS: Including all floor space for equipment.			
AISLES (Be sure to exclude any areas where Aisles cross or overlap.)			
3 @	177.84	5.0	2,667.60
3 @	43.59	5.0	653.85
WORK AREAS	40.0	2.0	80.00
(Needed for manipulating trucks.)	5.0	3.0	15.00
EQUIPMENT AREAS (Floor space taken up by fans, tanks, blowers, etc.)			
TOTAL UNOCCUPIABLE AREAS			3,416.45

SUMMARY OF AREAS	Sq. Ft. & Decimal
GROSS AREA	10,800.00
LESS UNAVAILABLE AREAS	872.04
AVAILABLE AREA	9,927.96
LESS UNOCCUPIABLE AREAS	3,416.45
OCCUPIABLE (NET STORAGE) AREA	6,511.51

SUMMARY OF CUBIC CONTENT (VOLUME) DESCRIPTION	AVAIL. HGT.	CUBIC FEET
GROSS CUBIC CONTENT	11.15	120,420
AVAILABLE CUBIC CONTENT	10.50	104,244
OCCUPIABLE " "	9.00	58,604

AREA	CONSTRUCTION AND INSULATION MATERIALS — Kinds of Materials used and thickness of each in inches. Be sure to include any air spaces.
NORTH WALL	8" Concrete 4" Cork 1" Cement
SOUTH WALL	8" Concrete
EAST WALL	Same as north wall
WEST WALL	Same as north wall
FLOOR	7.75" Concrete
CEILING	7.75" Concrete 4" Cork 4" Cement
ELEVATORS	Same as north wall
DOORS	5 @ 1.5" Wood 4.0" Cork
OTHER	

COLD & HOT BRINE & REFRIGERANT PIPING

Pipes arranged in coils which project into storage space affect piling heights. Give details below.

DIAM. IN	CONTENT	LINEAL FT.	COIL DIMENSIONS IN FEET — LOCATIONS (Over Aisles, etc.)	DEPTH FROM CEILING	LENGTH
2.0	COLD BRINE	4820	Over aisles	2.93	160.(
2.0	HOT " REFRIGERANT	320			

Following are used to calculate "Dead Load Losses" The times for men, lights and motors are reduced to an average day (24 hr.) basis, so week-end activities must be taken into consideration.

MEN WORKING

NO. OF MEN	CLASS OF WORK (Porters, Foremen, etc)	HOURS IN ROOM PER WEEK	MAN HOURS PER WEEK	MAN HOURS AVER. DAY
1	Porter	40	40	5.71

LIGHTS BURNING

NO. OF LIGHTS	WATTS EACH	WATTS TOTAL	HOURS BURNED PER WEEK	WATT-HOURS PER WEEK	WATT-HOURS AVER. DAY
28	50	1,400	40	56,000	8,000

MOTORS (FANS, BLOWERS, ETC.) RUNNING

NO. OF MOTORS	HORSE POWER EACH	HORSE POWER TOTAL	HOURS RUN PER WEEK	HORSE POWER-HOURS PER WEEK	HORSE POWER-HOURS AVER. DAY
1	2.5	2.5	168	420	60

Form 1, Room Data Sheet for recording dimensions, insulation and space data.

DEAD LOAD LOSSES (OR GAINS) WORK SHEET

ROOM B-4 AVERAGE TEMPERATURE 30 °F

COMPANY _____ LOCATION _____

ROOM WALL LOSSES (OR GAINS)

Information & calculations below are used to find the refrigeration necessary to maintain room at desired average temperature

EXPOSED SURFACE	DIMENSIONS In Feet and Decimal			CALCULATION OF SURFACE LOSS PER SQ. FT. PER DEGREE DIFF. OF TEMP.		ADJACENT CONDITION TO WHICH SURFACE IS EXPOSED (Outside Air, etc.)	WALL LOSSES (OR GAINS) B.T.U.'S PER HOUR AT 30°F OUTSIDE MEAN TEMP.			AT 80°F OUTSIDE MEAN TEMP.		
	LENGTH	HEIGHT	AREA	U FACTOR	UxAREA		ADJ. °F	°F DIFF.	B.T.U.'S/HR.	ADJ. °F	°F DIFF.	B.T.U.'S/HR.
NORTH WALL	177.84	10.50	1,867	.0673	125.65	Outside Air	40°	10°	1,256.5	90°	60°	7,539.0
SOUTH WALL	177.84	10.50	1,457 *	Not needed	-	30° F (Cooler)	30°	0°	-	30°	0°	-
EAST WALL	58.58	10.50	615	.0673	41.39	Outside Air	40°	10°	413.9	90°	60°	2,483.4
WEST WALL	58.58	10.50	615	.0673	41.39	Outside Air	40°	10°	413.9	90°	60°	2,483.4
FLOOR	177.84	58.58	10,418			30° F (Cooler)	30°	0°	-	30°	0°	-
CEILING	177.84	58.58	10,418	.0643	669.88	-5° F (Freezer)	-5°	35°	23,445.8	-5°	35°	23,445.8
DOORS 5 @	5.0	5.6	140	.0638	8.93	Elevator Shaft	20°	10°	89.3	70°	40°	357.2
ELEVATORS	43.67 8.67	10.50 10.50	410 **	.0673	27.59	Elevator Shaft	20°	10°	275.9	70°	40°	1,103.6
Hot Brine Pipe		320 linear feet	1.6	x 2 x 65°					26,000.0			26,000.0

* Adjusted for elevator area.
** Adjusted for door area.

TOTAL WALL LOSSES (OR GAINS) B.T.U./HR. — AT 30°F MEAN TEMP. 4,273.3 — AT 80°F MEAN TEMP. 16,523.8

ROOM LOSSES DUE TO AIR CHANGES

These losses occur because of door openings. Tables are used to determine the basic factors which are to be applied to each room according to conditions.

AVAIL. VOL.CU.FT.	NO. AIR CHANGES/DAY	ACTIVITY DAYS PER WEEK	NO. AIR CHANGES IN AVERAGE DAY
B 96730	1.4	5	A 1
OUTSIDE AIR TEMP.		30°F	80°F
ADMITTED AIR TEMP.		20°F	70°F

HUMIDITY	50 %	60 %	50 %	60 %
HEAT REMOVED BTU/CU.FT.	C .24	D .29	E 1.69	F 1.87
HEAT REMOVED AxBxC or D or E or F / 24	BTU/HR 967.3	BTU/HR 1168.9	BTU/HR 6811.6	BTU/HR 7537.1

MISCELLANEOUS ROOM LOSSES

These losses must be reduced to an average day. It is necessary, therefore, to take into account activities over the week-end, but to weight them properly.

MEN IN ROOM WORKING		LIGHTS BURNING		MOTORS RUNNING	
MAN-HRS PER DAY	G 5.71	WATT-HRS PER DAY	H 8,000	HP-HRS PER DAY	J 60
HEAT LOSSES G x 750 / 24	BTU/HR 178.44	HEAT LOSSES H x 3.24 / 24	BTU/HR 1,080.0	HEAT LOSSES J x 3000 / 24	BTU/HR 7,500.0

SUMMARY OF ROOM LOSSES (OR GAINS)

OUTSIDE MEAN T	30°F		80°F	
HUMIDITY	50 %	60 %	50 %	60 %
WALL LOSSES	4,273.3	4,273.3	16,523.8	16,523.8
AIR CHANGE LOSSES	967.3	1,168.9	6,811.6	7,537.1
MEN WORKING LOSSES	178.4	178.4	178.4	178.4
LIGHT LOSSES	1,080.0	1,080.0	1,080.0	1,080.0
MOTOR LOSSES	7,500.0	7,500.0	7,500.0	7,500.0
TOTAL ROOM LOSSES BTU/HR	12,064.4	11,862.8	32,093.8	32,819.3
(DIVIDE BY 12,000) TONS PER DAY	1.05	.99	2.67	2.73

Form 2, Work sheet—Dead Load Losses or Gains on which the loads are calculated and summarized.

Dead Load Losses and Gains

The uninitiated assume that the only heat losses which must be compensated for by the refrigeration plant are those through the outside walls of the rooms. Actually, there are several other kinds which will now be described in detail. Before doing this, however, we must be familiar with certain units used for measuring heat.

The British thermal unit, abbreviated as Btu, is the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit. Thus, to increase the temperature of ten pounds of water 1 F requires 10 Btu. Likewise, to raise one pound of water from 35 F to 40 F also requires 10 Btu.

Another unit which will be used frequently in our present work is the ton of refrigeration. This unit embraces not only heat but also the *time rate* at which heat is absorbed. A ton of refrigeration is defined as the absorption of 200 Btu per minute, 12,000 Btu per hour or 288,000 Btu in a day of 24 hours. A 100-ton compressor is, therefore, one which is capable of absorbing 28,800,000 Btu a day. An understanding of these units is necessary in order to follow the discussion of heat losses and gains.

The heat losses about to be considered—those through walls as well as those due to air changes when doors to rooms are opened, heat generated by men working in the rooms and the heat from hot brine lines, lights and motors —are collectively known as *dead load losses.*

First, wall losses and gains. These are simply a matter of heat transfer—the flow of heat through the walls, floors and ceilings of storage rooms. The amount of heat, measured in Btu which will flow through these structural members depends upon the kinds of materials of which they are made, their exposed surface areas and the differences in temperature on their exposed sides. Because heat always flows from a warmer to a cooler environment there is a flow of heat from a cooler maintained at 34 F to a freezer at -10 F, just as surely as there is heat flow from outside the cooler through the exposed walls when the weather is such that the temperature is above that of the room. According to the terminology used here a heat loss means the heat absorbed by a room which must be compensated for by refrigeration. In this sense, the heat transferred from the cooler to the freezer through the common wall is referred to as a *gain* for the cooler and a *loss* for the freezer. Likewise, should a hot brine line run through a room, the heat absorbed from it by the air in the room is a *loss.* These distinctions will perhaps be clearer if we think in terms of dollars and cents. Losses must be paid for as refrigeration expenses—they are financial losses.

Many excellent texts are available in which complete details are given for calculating the rate of heat transfer through various kinds of materials and structural walls.[2] The reader is referred to such a work for full technical information on this subject because, in the space and time available it would be impossible and quite useless to repeat what is so readily available. We shall, therefore, limit ourselves here to such explanation that the reader will know what is meant by the coefficient of heat transmission. This is a unit which gives for a particular material or combination of materials the number of Btu per square-foot of heat-transfer surface per degree difference in temperature per hour. This factor is symbolized by the capitol letter U. The value of the U factor for any kind of wall, ceiling or other separating medium is found in tables or can be developed by the use of formulas given in the kinds of texts referred to above.

Space is provided in our Room Data Sheet for recording the composition of the walls, ceiling and floor through which heat moves into or out of our sample room. We now have need of another form for use in calculating the surface losses or gains for this room. Form 2, Dead Load Losses or Gains Work Sheet, is used for this purpose and for calculating other losses falling in this classification. Some of the same information recorded in Form 1 is repeated here, but it was found much easier to check calculations when all the factors are on one sheet rather than on several.

Heat Gain Calculations

The room selected for illustration is a cooler carried at 30 F. It is so located that its north, west and east walls are exposed to outside atmospheric conditions. The south wall and the floor are barriers between the room and other coolers in which the same temperature (30 F) prevails. The ceiling separates the room from a freezer carried at -5 F. Elevators and stairwells are on the south side of the room and are centrally located.

In making the calculations for wall losses we have made certain assumptions which need to be explained.

Outside mean temperature is the mean temperature for the given month as reported by the U. S. Weather Bureau for the locality of the plant.

Adjusted outside temperature is 10 F higher than mean temperature to allow for the fact that the sun's rays strike the building directly and the temperature in the vicinity is higher than that reported officially.

Outside temperatures of sheltered platforms, etc. are assumed to be the same as mean temperature.

Elevator-shaft temperatures, because they open into refrigerated room are assumed to be 10 F lower than mean temperature.

Engine room offices, etc. are considered to be carried at a constant temperature of 70 F.

Storage room temperatures fluctuate somewhat, but for the sake of simplicity, they are assumed to be constant—coolers at 30 F, freezers at -5 F and sharp freezers at -15 F.

With these standard temperatures in mind the reader will be able to follow how the losses through the walls in the sample room have been calculated. The values of the U factors for the different walls, floor and ceiling were built-up from information in reference books mentioned before.

Note particularly how *gains* are shown in the record. The figures are circled. When a column of losses and gains is being totaled, the losses must be added together and from the total of the losses, the total of the gains must be subtracted in order to arrive at the net total.

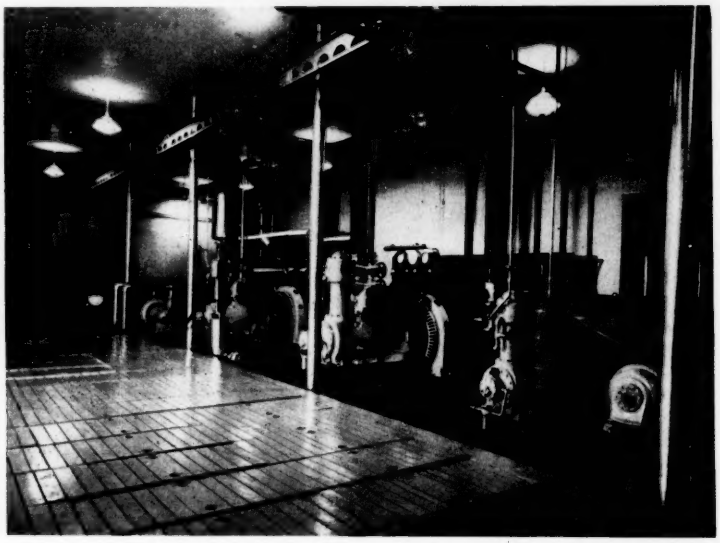
The heat input due to the hot brine line in the room is found by using the standard formula shown in refrigeration texts mentioned previously.

Form 1 is used to collect the information for the other dead load losses. The number of men working and their hours in the room are both estimated. The house in question is quite active and it was felt that a good average was one man working continuously in each room. The figure of 40 man-hours for a five-day week must be reduced to the equivalent number of hours per day in a seven-day week.

The information on lights is quite exact—the number of lights and the resulting wattage is multiplied by the number of hours they are burned to arrive at the watt-hours. It is assumed here that the men do not turn the lights off during the working hours of the plant. Here again, the figures must be reduced to an average day in a seven-day week. The men actually work five days, so it is assumed that the lights are burning during that period only.

(Continued on page 65)

New Ice Plant Serves Kentucky Community



The tank and machine room of the Elkton Plant are well arranged for convenient operation and maintenance. Along the wall behind the compressors are the ammonia condensers, the control boards and the water demineralizing unit. The plant structure and equipment are painted in attractive light colors and good illumination is provided.

THE Kentucky Ice Service Co. has recently placed in operation at Elkton, Ky., a new ice plant which, because of its efficiency of design and economy of operation, has caused great interest among the industry and those it serves.

This new plant, installed by Radabaugh-Corbitt Co. of Nashville, Tenn., manufactures 50 tons of ice per day. The functional simplicity of this plant is such that the only labor used in the manufacturing process is three men, each on an eight hour shift. Over an operational period of several months, an extremely accurate account was kept of all costs including labor, water, and electricity used in the manufacture of the 50 tons of ice per day delivered to the store room. The production cost was 91 cents per ton of ice which is considered quite low for a plant in this size range.

The Compressors

Primary factors in the economical operation of this plant were the Wolf-Linde ammonia compressors used. These compressors were built for this installation by Dersch. Gesswein & Neuert, Inc. of Chicago. Two $8\frac{1}{2} \times 8\frac{1}{2}$ Wolf-Linde compressors are directly connected to the tank, using a Frick Verti-flow Coil.

A $6\frac{1}{2} \times 6\frac{1}{2}$ Wolf-Linde compressor is connected to the store rooms. Suction from the store rooms is brought back through a fore-cooler which cools the water used in making the ice to a temperature of between 45 and 50 Fahrenheit. This fore-cooler also acts as an accumulator and to remove any liquid ammonia from the suction gas to the compressor. The $6\frac{1}{2} \times 6\frac{1}{2}$ compressor is also cross-connected so that it can operate the ice tank in off season months.

Automatic Operation

The Elkton plant has been referred to as the "push-button ice plant" because its operation is automatic to the greatest extent possible. This ease of operation is achieved through the use of a standard Trumbull Switch Board with automatic control which operates the plant. All starters and equipment are push-button operated. Being equipped with high-pressure cut-outs, it will automatically stop any piece of equipment which might be in trouble. The Trumbull board automatically operates all the refrigerating equipment in the plant: the ammonia compressors, as well as the pumps, and auxiliary equipment.

An important factor in economy and quality of product is the American Cyanamid Demineralizer which enables the plant to produce crystal-clear blocks of ice from hard water without the necessity of pulling cores.

The Kentucky Ice Service operates a delivery system from its Elkton ice plant which is so scheduled that its trucks complete delivery of all ice by 11:00 a.m., and delivery is made at each individual stop at the same hour each day in the week. The service operations of the company are thus on a par with the excellent plant which produces the ice for the community and the surrounding territory.

Business Publicity

THE September 17 issue of Business Week carried an article on the status and growth of the ice industry, pointing out that despite mechanical refrigerators ice sales have doubled in the past twenty-five years. The article then reviews the promotional work of the National Association of Ice Industries which has resulted in modern selling of ice and ice-using appliances.

Court Decisions

By Leo T. Parker

Unavoidable Law Suits May Be Won By Knowledge of New and Modern Court Decisions on Business Law

ALL courts agree that almost any lawyer can win a law suit if the testimony is strictly in favor of his client. But even an exceptionally good lawyer cannot win a favorable verdict if his client has violated all known legal business procedures.

Readers who keep themselves informed of the cause and outcome of outstanding higher court decisions involving other manufacturers and sellers, may conduct their business in view of winning unavoidable law suits. Knowledge of the following new and modern higher court decisions will enable them to prepare to win law suits.

Is Company Liable When Employee Injures a Customer in Fight?

First, I shall answer an interesting question recently asked by an official of an ice company. This question is: "We have a law suit on our hands. Can you assist us to win it? You did assist us some months ago by referring our lawyer to a higher court case to the point and in our favor. Can you repeat? Here is our problem: For two years we employed an ice deliveryman named Smith to deliver ice to our downtown customers. We paid Smith a salary and commission. One day while he was delivering ice to a restaurant he got into an argument with the proprietor of the restaurant over payment for ice. After the argument was over Smith and the proprietor went into a nearby saloon to get some beer and before they came back they had a fight and Smith severely injured the proprietor. The proprietor's dependents are suing us for damages. Are we liable?"

The answer is: You are not liable in damages to the restaurant proprietor's dependents because Smith injured the proprietor while not attending to your business. If, however, Smith had injured the proprietor while arguing over payment of ice you would be liable.

Test is Whether Employment Contemplates Use of Force

The real test of an employer's liability is not whether the employee's employment contemplated the use of force, but whether the act complained of arose directly out of and was done in the prosecution of the business that the employee was employed to do.

For illustration, in Greathouse v. Texas Public Utilities Corporation, 217 S. W. (2d) 190, reported March, 1949, the testimony showed facts, as follows: The Texas Public Utilities Corporation is engaged in the manufacture and distribution of ice. One Walton was employed by this company as an ice delivery man, operating a light truck or pick-up and assigned to a particular area within the town.

One day while delivering ice Walton saw an ice card was at the front of a home owned by a man named Greathouse. Walton stopped his truck in front of the house and called to Greathouse, who was standing in the door, to come to his truck, which he did. Walton was intoxicated and an argument ensued about the ice. Finally, Walton got out of the truck, advanced toward Greathouse and struck him with his fist.

A terrific fight ensued in which Walton was severely beaten. After the fight, Walton returned to his seat in the truck. Then Walton sold Greathouse fifty pounds of ice. Greathouse then returned to the front yard with a pan of water and a cloth so he could wash the blood from Walton's face and clean him up so that he might go on his way. Walton got out of the cab and went to the rear of the truck and Greathouse proceeded to wash the blood from his face. Greathouse stooped down to rinse the blood from the cloth and as he straightened up, Walton struck him on the back of the head with his ice tongs, knocking Greathouse unconscious and from the effects of which he died three days later.

Greathouse's dependents sued the ice company for $20,000 damages. The higher court decided that the ice company was not liable because Walton had killed Greathouse after the ice was delivered and paid for, and while not attending to the ice company's business. This court said:

"We are forced to the conclusion that he (Walton) assuredly was not now acting for his employer. The fact that he took with him the ice tongs, concealed behind his back, showed malice, resentment and a fixed purpose to have his revenge. It was not in furtherance of his employer's business, but a personal matter of his own."

For comparison, see Felder v. Houston Company, 203 S. W. (2d) 831. In that case, Felder's automobile collided with the rear of a company's truck. It was the duty of the operator of the truck to get the name of the driver of the other vehicle, the number on his license plate and other pertinent information. The truck driver went back to Felder's car for that purpose. Felder refused to state his name, started reviling the truck driver and got out of his car. Then the truck driver struck Felder in the face. The higher court held the company liable, and said:

"It is undisputed that Goodson (truck driver) in keeping with his duties, went to Felder's car to get certain information, and while thus about his master's business and before he had finished his mission, committed the assault in question."

And again see International Company v. Anderson, 17 S. W. 1039. This court said:

"The act of the servant may be contrary to his express orders, and yet the master may be liable. But the act must be done within the scope of the general authority of the servant. It must be done in furtherance of the master's business, and for the accomplishment of the object for which the servant is employed."

Amount of Damages has no Effect Upon Final Award

According to a recent higher court the amount of damages asked by a person who is negligently injured by the driver of a truck has little effect on the actual and final award approved by the higher court.

For example, in Powell v. Ice Service, Inc., 36 So. (2d) 888, one Powell sued the Ice Service for heavy damages. Powell proved that she was struck by an ice truck driven by an employee of Ice Service while she was standing

beside a parked automobile in an alley. It is shown that the truck was being driven by the employee of the ice company in the course of his employment. Also, the testimony showed that the truck driver was negligent. Powell asked the court to hold the ice company liable for $17,270 damages. The lower court awarded only $3,141 damages, and the higher court approved the verdict saying:

"We feel that the amount awarded by the lower court is reasonable and we see no reason for disturbing his award."

Driver Liable for Injuries Caused While Violating State Law

Modern higher courts consistently hold that the driver of a motor vehicle who causes an injury while violating a state law always is responsible in damages.

For example, in Decatur Ice Company v. Grizzard, 37 So. (2d) 201, it was shown that a truck owned by the Decatur Ice Company, without stopping, as a state law required entered a main highway from a side road at a speed of approximately thirty-five miles per hour. An oncoming passenger automobile collided with the truck. The injured driver in the passenger car sued the ice company for damages. In holding the latter liable, the higher court said:

"The plaintiff (car owner) was traveling at a lawful rate of speed and we find no tendency in the evidence to indicate that he was guilty of any negligence."

Liability for Injuries Received While Delivering Ice

Considerable discussion has arisen from time to time over the legal question: When can an ice deliveryman recover damages for an injury received when delivering ice on private property to a customer? The answer is: If the thing that caused the injury was plainly visible to the ice deliveryman, he cannot recover damages for an injury.

For example, in Nabors v. Atlantic Biltmore Corporation, 49 S. E. (2d) 688, the testimony showed facts, as follows: An employee named Nabors was employed by the American Ice Service Company to deliver ice. Nabors was seriously injured when dragging a 300 pound cake of ice through a passageway in the ice room of the Biltmore Hotel. The injury was caused by sharp and jagged points of wire which stuck out at an angle so as to be dangerous to anyone.

Nabors sued the hotel company for damages alleging that the latter was negligent in (a) failing to keep the premises safe; and (b) allowing and permitting a dangerous and unguarded fixture to remain in said ice room. The higher court refused to hold the hotel company liable, saying:

"If the plaintiff (Nabors) by ordinary care could have avoided the consequences to himself caused by the defendant's (hotel's) negligence, he is not entitled to recover . . . . . The plaintiff (Nabors) went into the ice room which was lighted by an electric light. He does not allege that his eye-sight was defective, nor that the light itself was poor or insufficient to properly light the room."

This court explained further that the owner of private property is liable for injuries to ice deliverymen only if the testimony shows that the latter used ordinary care to protect himself against injury and the property owner was negligent.

Contributory Negligence

Modern higher courts consistently hold that no person or company can recover damages for an injury sustained as a result of the injured person's own negligence.

For illustration, in Card v. Carrigan Tavern, 61 Atl. (2d) 263, it was shown that an employee named Card was employed by the Seaboard Ice Company for the delivering of ice. For two years he had made daily delivery of ice at the barroom of the Carrigan Tavern. In the floor of the barroom, between the bar and the back bar, was a trap door which opened upwards and was used for the purpose of dropping barrels to the cellar by sliding them on a runway. Card knew that the trap door was there. One day he fell through the open trap door and into the basement. He sustained severe injuries and sued the Carrigan Tavern for damages. The higher court refused to award Card damages, saying:

"Plaintiff (Card) was burdened with the duty of exercising a degree of care for his own safety commensurate with the known risk . . . Plaintiff (Card) was perfectly aware that there was a trap door which might be open, which was open and which he could readily have seen, was open had he looked, and that notwithstanding such knowledge and such opportunity he rushed into the danger without making an observation."

When is an Ice Deliveryman an Independent Contractor?

Considerable discussion has arisen from time to time over the legal question: Under what circumstances is an ice deliveryman an independent contractor? The answer to this question is important for these reasons: First, an ice company which employs an independent contractor is not required to pay either unemployment or insurance under the State Workmen's compensation Act for the employee; second, the ice company is not liable in damages for injuries to persons and private property caused by negligence of an independent contractor; and third, the ice company does not pay social security and like taxes on independent contractors.

For illustration, in Cooper v. Colonial Ice Company, 51 S. E. (2d) 889, is was shown that the Colonial Ice Company furnished an ice deliveryman a horse and wagon and all equipment used in connection with retail delivery of ice. The employee's hours, territory and other details concerning sale and delivery of ice were supervised by the ice company. The employee was charged $1.20 for each block of ice which he sold at the regular retail price of $1.80. Whenever orders were received by the company for ice to be delivered in the territory served by the deliveryman these orders were turned over to him to make delivery. Each day when the employee returned from selling ice, he paid the ice company at the specified rate and was credited with ice unsold.

While the employee was engaged under this arrangement in delivering ice, he was struck by a motor truck and injured, and died in consequence. His dependents sued the ice company for compensation under the State Workmen's Compensation Act. The higher court ordered the company to pay compensation because it decided that the employee was not an independent contractor, and said:

"It is well settled as a general rule that an independent contractor is one who exercises an independent employment and contracts to do certain work according to his own judgment and method, without being subject to his employer except as the result of his work."

This court explained that if the employee had merely purchased ice from the Colonial Ice Company, paid for it and made deliveries whenever he pleased, and was not required by the company to report for work at any certain time, and could quit when he wanted to do so, he would have been an independent contractor.

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The Ice Industry

National Association of Ice Industries

Executive Offices
1706 L St. N. W., Washington 6, D. C.

PRESIDENT
M. J. Garvey, St. Joseph, Mo.

EXECUTIVE SECRETARY
Mount Taylor, Washington, D. C.

Ice Convention in New York–November 15-18 To Turn Spotlight on the Ice Industry

EARLY reports indicate that the annual convention of the National Association of Ice Industries will attract the usual large crowd of interested ice men, those associated with the ice business, and visitors. Details of the business program have not yet been announced but speakers have been selected who have had a background of practical experience in the fields they will discuss. These will include ice men and some speakers from outside the industry.

Staff Members to be Available for Consultation

So that all icemen coming to the convention will have an opportunity to talk with staff members, special arrangements have been made. After each convention session, each staff member will be available in rooms on the mezzanine floor for a definite period to be announced at the first day's meeting. This action has been taken so that any questions about various phases of staff work can be answered. It will also give icemen an opportunity to get first hand advice on legal matters, public relations, advertising, marketing, and research projects.

Those members of the staff who will be standing by, anxious to meet personally with icemen, are: Mount Taylor, Executive Secretary; Guy W. Jacobs, Public Relations Director; Daniel A. Prager, Director, Personnel Training and Marketing Department; C. P. Austin, Director, Research and Engineering Department; William T. Jobe, Legal Counsel; and Francis X. Timmons, Director, Advertising and Publicity.

The sessions will last about three hours. Talks, papers and discussions will all be pointed toward practical application to the ice business. Considerable attention will be paid to what ice distributors and manufacturers can do to hold present business gains and open new fields for more business. This will cover use of vending machines, packing and merchandising of processed ice, pre-cooling and icing produce, and sales of auxiliary ice to mechanical owners. The legal aspect will be covered with an outline of National laws and legislation affecting the ice industries, both those already passed by Congress and those in prospect.

As at former conventions, a presentation will be made of the 1950 advertising program, giving details of this program and showing samples of the advertising materials to be used.

Reports of the officers and department heads of the association will be presented briefly, setting forth what has been accomplished during the past year and outlining plans for the future. The exhibits of machinery, appliances, equipment and supplies, always an interesting part of the convention, will again be worthy of the attention of all. There will be probably as many exhibitors as were at the St. Louis convention last year which established a record.

Centennial Ice Queen

Plans have been made, details of which have not yet been announced, to observe the 100th anniversary of the ice industry in America. One event in this phase of the program will be to crown a beautiful girl as the Centennial Ice Queen.

Top New York Talent to Entertain at Annual Banquet

Formal entertainment will be limited to one event, the annual banquet Thursday evening. But this event will be long remembered by all who are fortunate enough to be present. The main ballroom of the Commodore Hotel New York City, will be the scene of one of the most elaborate floor shows ever presented to convention-going icemen. Since New York City is the heart of the entertainment world, the entertainment committee has been afforded the opportunity of engaging top Broadway talent.

Not since 1936 have icemen had a convention in New York. This year takes on added significance in that the Commodore meeting will launch the 100th Anniversary of the Manufactured Ice Business. It is only fitting that a gala affair spark this once-in-a-lifetime celebration.

Although in past years two nights of fun and frolic were offered, it is the opinion of the entertainment committee that New York offers so much in the form of entertainment, that one big night of an ice-sponsored variety show is sufficient. This will allow for guests to have more leisure time to see the sights and whatever plays for which they can get tickets.

Thursday evening's get-together will start with a banquet. Dress is optional. A prominent New York orchestra will be on hand for background music for the show people. Singers, dancers, and variety acts from famous Broadway nightclub floor shows promise at least an hour and a half of thrills, laughs, and wholesome enjoyment. Dancing will follow.

Tickets will be available at the registration desk and may be exchanged later for reserved tables. All tables are reserved, so it will be advantageous for icemen to get their friends together at the same table. It will also help to sign up early.

Funds for 1950 Ice Advertising Nears Top Nearly $300,000 Subscribed

A BURST of applause greeted the announcement that with the end of the advance campaign to raise funds for the 1950 Ice Promotion Program, a sum slightly less than $300,000 had been subscribed. This was the reaction of over 40 members of the National Ice Public Relations Fund-Raising Committee as Guy Jacobs, Public Relations Director, told them of the number of dollars already realized as a result of 234 individual signed pledges received. The event took place at a recent meeting held at the Palmer House in Chicago.

In the absence of George Steers of Kalamazoo, Mich., David Copeland of Richmond, Ky., presided at the day-long session of Icemen from all over the country. Mr. Copeland's introductory remarks ignited a spark of enthusiasm that has seldom been achieved during any past fund-raising effort. He praised the efforts of the six major companies who were responsible for sending out a letter to the industry announcing that they would invest a proportionate share of money—3 cents per ton—based on their 1948 ice tonnage sold. He emphasized the importance of the coming year—the 100th anniversary of the invention of the first American ice machine—as a once-in-a-life-time opportunity to promote the Ice Industry. Mr. Copeland also outlined the ways and means by which campaigners would contact every Ice plant in the nation in an effort to get behind the campaign drive to raise $500,000.

A series of mailings have already been prepared and will be sent out at intervals to all Ice plants to keep them informed as to how each dollar will be spent during the coming year.

Brief comments were made by Harold McLain of the Railways Ice Co., R. C. Muckerman of the City Products Corp., E. L. Gunn, Jr. of the American Service Co., and two members of the Finance Committee—J. Ayers and Leonard L. Swartz. Mr. Muckerman emphasized that his company and other large subscribers to the campaign would cooperate fully with all campaigners in contacting ice companies in towns which have subsidiary multiple operations. Mr. Swartz in his brief statement pointed out that ice companies were not making a contribution to a fund-raising campaign but rather were making an investment in the future of their own business.

Advance Subscribers Honored

An innovation has been injected into this year's fund-raising campaign in that all companies which sent in signed pledge cards prior to midnight of September 15, 1949, will receive a framed certificate of acknowledgement that their company's name has been inscribed on the Honor Roll of Advance Subscribers. All ice companies who subscribe to the Anniversary Campaign will receive a beautiful plastic paper weight souvenir, appropriately inscribed in recognition of their part in the anniversary program.

There were 15 excellent reasons given as to how the National Association of Ice Industries National Public Relations Program benefits an Ice plant:

1 — So that more people in every section of the country will have better appreciation of Ice uses.

2 — To develop new outlets for the sale of Ice.

3 — To promote enthusiasm within the industry for its own product.

4 — To educate the younger generation on the importance of Ice; thus, insuring future sales.

5 — To cooperate with other industries which use Ice and to keep them sold on the economy and practical performance of Iceman's Ice.

6 — To meet competition with hard-hitting counter-selling methods which not only hold present business, but create new customers.

7 — To assist local Ice companies with a local advertising campaign in newspapers and on the radio.

8 — To show by example and actual help how a local company can improve its public relations through better knowledge of publicity outlets.

9 — To encourage a good Press.

10 — To participate in Convention exhibits on a greater scale than any local Ice company could afford to do alone.

11 — To raise funds for printing of colorful, high-quality literature—booklets and folders—for nation-wide distribution to consumers.

12 — To make literature available to local Ice companies at a mass production cost.

13 — To offer advice on any phase of local advertising and publicity.

14 — To further the exchange of selling ideas and solve local problems by widening the contacts of every local Ice company.

15 — Most important—increase over-all ice tonnage *sold;* thus improving the lot of every Public Relations subscriber.

Of course the highlight of the meeting was the announcement by Mr. Jacobs of the amount already subscribed. With a running start such as this, Mr. Copeland told all present that in view of the many opportunities inherent in a 100th Anniversary Campaign, the slogan for all campaigners should be: "Don't take no for an answer."

Operating Committee Formulates Plans for 1950 Advertising

MEMBERS of the Operating Committee of the National Association of Ice Industries met recently in Chicago to formulate plans for the 100th Anniversary National Ice advertising program. E. J. Churchill, President of Donahue & Coe Advertising Agency, New York, N. Y., presented preliminary layouts of the full-color and black and white magazine advertisements for 1950. The theme of the campaign as presented by Mr. Churchill met with enthusiastic approval of the members of the Operating Committee.

Because next year's program is still in a preliminary stage and the finished product will be presented to the National Convention to be held at the Hotel Commodore in November, the theme of the campaign has not yet been announced. However, it's safe to say that the agency's idea should meet with the hearty approval of Icemen throughout the nation. Each national ad will encompass, in general, the ideas of the previous advertising, but all committee members agree that these ads will lend themselves to more effective local tie-in.

Each ad will carry the phrase—1850—One Hundred Years of Ice Progress—1950—to tie-in with the publicity program to tell the public of the 100th anniversary of the Ice business. A proportionate part of the advertising will be devoted to selling domestic refrigerators and will fea-

ture the economical aspects of their purchase by consumers.

Trade paper advertising will be continued on as large a scale as in 1949.

The advertising agency was instructed to complete the production of the program in order that a formal presentation can be made at the November Convention. As spokesmen for the Operating Committee said, "It will be well worth the time and effort of every Iceman to see and hear Donahue & Coe's presentation of the 1950 Advertising Program. The knowledge gained from this information alone will be well worth a trip to New York."

Those present at the Palmer House for the meeting were Operating Committee Chairman, E. L. Gunn, Jr., Thomas Beck, Walter Blessman, Pete Andres, David Copeland, Harold Hacke, Guy Jacobs, Mount Taylor, Francis X. Timmons, along with E. J. Churchill and L. B. Kaufman of Donahue & Coe.

Exhibits of Supplies and Equipment

THE exhibits at this year's ice convention will provide, as usual, an important source of information. They will all be located on the ballroom floor of the Hotel Commodore. At last report, 39 exhibitors had reserved space to show their products ranging from heavy machinery to advertising novelties. Following is a list of exhibitors as of the middle of October.

Air Induction Ice Bunker Corp., New York 1, N. Y.
Allen Filter Co., Toledo, Ohio.
Bateman Foundry and Machine Co. Inc., Mineral Wells, Tex.
Sam Bonart Uniforms, Inc., New Orleans, La.
Chemical Solvent Co., Birmingham, Ala.
F. B. Dickinson & Co., Des Moines, Iowa.
Equitable Paper Bag Co. Inc., Long Island City 1, N. Y.
Flynn and Emrich Co., Holliday and Saratoga Sts., Baltimore, Md.
Frick Co. Inc., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Hamilton Metal Products Co., New York 1, N. Y.
Ice Cooling Appliance Corp., Morrison, Ill.
Ice Plant Equipment Co., Philadelphia 25, Pa.
Index Coupon & Supply Co., La Porte, Ind.
Infilco Inc., Chicago 16, Ill.
King Refrigerator Corp., Glendale, L. I., New York.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Lilly Co., Memphis 1, Tenn.
Jos. A. Martocello & Co., Philadelphia 7, Pa.
Franklin P. Miller & Son, Inc., East Orange, N. J.
Northland Mfg. Co., Minneapolis 1, Minn.
Ohio Galvanizing and Mfg. Co., Niles, Ohio.
Pittsburgh Waterproof Co., 2537-41 Penn Ave., Pittsburgh 22, Pa.
Power Equipment Co., Greensboro, N. C.
Progress Refrigerator Co., Louisville, Ky.
Refrigeration Engineering Co., Minneapolis 2, Minn.
Refrigeration Engineering Corp., Philadelphia 46, Pa.
Sanitary Equipment Manufacturing Co. Inc., St. Louis 3, Mo.
Thermo Cuber Co. Inc., Chicago 14, Ill.
Trusty Manufacturers, Inc., La Porte, Ind.
Union Bag & Paper Corp., New York 7, N. Y.
Union Canvas Goods Co., Philadelphia 33, Pa.
United Ice Supply Co., Boston 14, Mass.
Vivian Mfg. Co., St. Louis 10, Mo.
J. H. H. Voss Co. Inc., New York 54, N. Y.
Wagner Awning & Mfg. Co., Cleveland, Ohio.
Ward Refrigerator & Mfg. Co., Los Angeles 1, Calif.
Geo. M. Wessels Co., Los Angeles 36, Calif.
York Corp., York, Pa.

American Ice Ruling Stayed

A FINAL judgment September 16 by Superior Court Judge Freund, freeing American Ice Co. from restraint against paying dividends to common stockholders before preferred, was immediately stayed by Freund pending a second Supreme Court appeal. The stay does not prevent payment on common stock, however, if the concern leaves on deposit $75,000 of its $130,000 now in escrow with the court.

The stayed judgment, issued on application of Pitney, Hardin & Ward, counsel to the defendant company would dismiss the complaint filed by Austin Agnew of Tenafly, owner of 400 shares, and Richard L. Woodward of Montclair, owner of 300 shares of preferred stock, and direct return of the full amount in escrow to the company.

The judgment represents Freund's interpretation of a decision by the Supreme Court last May reversing Judge Bigelow, who ruled while a vice chancellor in early September, 1948, that preferred stockholders were entitled to $2 dividend, based on earnings and surplus capital history of the company. The Supreme Court in an opinion written by Justice Heher computed differently, disregarding annual net charges to surplus, and held that preferred stockholders had been overpaid $1.40 a share.

The stay was issued on notice by Lum, Fairlie & Foster, counsel to the plaintiff stockholders, that appeal would be made for review of the judgment by the Supreme Court.

Money Saving Tips on Marketing

A BOOKLET "Money Saving Tips on Marketing," designed specially for housewives has been issued by the Public Relations Department of the National Association of Ice Industries. The reading content covers facts on how to know fresh food by sight and touch, how to judge poultry and fish, how to select produce. It then tells of the many ways that ice adds to better living,—at little added cost.

This booklet was designed for distribution among their customers by ice companies. Printed in color and in attractive reading style and format, it should prove immediately popular as a part of local ice promotion.

Ice Punch Bowl at Wedding Reception

The ice punch bowl shown in the above picture caused a sensation at a wedding reception in Florida recently. The ice bowl, crystal clear with roses frozen in it, made the hundred and fifty guests reluctant to move on. Miss Muriel Washburn, secretary of the Florida Ice Association is shown serving the bride and groom, Mr. and Mrs. R. H. Cox.

"Class" Exhibit of Ice is Shown at California Restaurant Show

AN ICE exhibit under the auspices of the Ice Industry of Southern California was one of the high spots of the Pacific Coast Regional Restaurant Convention and Exposition at the Biltmore Hotel, Los Angeles, Calif., October 3, 4 and 5.

The theme of the booth was "Ice the Luxury Touch that Costs so Little" and the intent in creating it was to present a "Class" exhibit of ice . This was accomplished by designing the background for the proper placement of eighteen framed black and white photographs illustrating uses of ice in restaurants. These photographs showed particularly elaborate arrangements of crushed ice in the service of food; uses of crushed ice in the pantry for keeping food and the use of sparkling iceman's ice cubes in drinks.

Ice Exhibit at Pacific Coast Restaurant Exposition

The only ice actually used in the booth was placed in the two turret-top display cases originated and manufactured by the Marsh Equipment Co. of Glendale, Calif. In one case crushed ice was used as a base for salads prepared by the chef of the Biltmore Hotel. In the other case ice cubes were used to display bottles of champagne. A wine bucket on a stand was used with crushed ice in icing a bottle of wine.

The glamor of ice was further accentuated by the illuminated ice punch bowl, a specialty of John E. Fredin of Beverly Hills, who freezes these bowls for parties, banquets, etc. The first day this punch bowl was filled with flowers, the second and third day it was filled with sparkling ice cubes.

The young ladies in the booth emphasized the importance of iceman's ice cubes and iceman's crushed ice as necessary to give the effects shown in the photographs.

This convention attracted many thousands of people and the ice booth had a crowd in front of it at all times. The exhibit elevated ice to its proper place among the "Class" items such as china, glass, silver and fixtures that were prominently displayed in other booths, and there was no question—from the comments expressed—but that ice was considered as necessary to emphasize luxury in restaurants as any other of the costly items exhibited.

Shelf Life of Vegetables Extended by Coolness and Moisture

MARKET shelf life of fresh vegetables may be tripled by keeping them cool and moist. This was demonstrated in a recent study by John C. Hansen and L. P. McColloch, plant scientists of the U. S. Department of Agriculture. The study is one of a series on harvesting, storage, and shipment of fruits, vegetables and flowers under the Research and Marketing Act.

Eleven different vegetables were tested on four pieces of equipment of the type used in markets with a small to medium volume of business. One was a sloping ice-bed rack. Three others were horizontal trays. On one of these the produce was garnished with a cover of snow ice. Another tray was equipped with a drain and sprinkled at frequent intervals. The third tray was used as a dry rack display.

In nearly all cases the ice bed kept the vegetables fresher, greener, and crisper than the other displays during the four-day display period. The low temperature—usually around 45 F.—held diseases to a minimum. The moisture was sufficient for the vegetables to maintain or gain weight. Most vegetables tested on this rack were in good condition at the end of four days.

The rack garnished with ice maintained low temperature during the day—usually about 58 F.—but as the ice melted the temperature rose enough at night to allow the development of disease. The supply of moisture usually resulted in the commodity gaining weight.

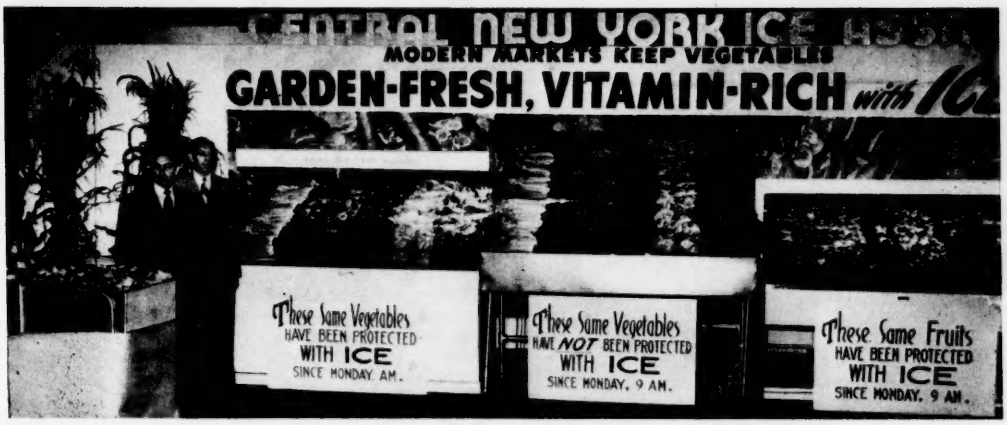
Commodities held on the sprinkled rack during the day and held at 40 F. at night were in good condition longer than those on the dry rack. Most produce readily absorbed moisture and gained in weight. Warm temperatures during the day—around 73 F. in the afternoon—favored the development of disease and advanced aging in many commodities.

The vegetables on the dry rack remained in good condition only a relatively short time, a day in most cases as compared with four days for those on the ice rack. At room temperature, there was excessive decay in many commodities along with severe withering and loss in weight. Radishes, green onions, beets, beans, and peas appeared to be benefited much more by cool moist conditions than were eggplant, cucumbers and squash.

Kolderol Units Again in Production

PRODUCTION and shipment of Kolderol Units has been resumed on a prompt basis according to George L. Pownall, patentee and distributor. The units which freeze small cylinders of clear ice are designed for use in standard ice freezing tanks. The Kolderol unit fits in the space provided for regular block ice freezing cans and produces ice in ready-to-use form for applications interchangeable with cubes or the larger sized ice. Interest in the equipment among ice producers overseas has also continued. Mr. Pownall reports recent shipment of units to the British West Indies. Information and literature on Kolderols can be obtained by inquiries directed to Mr. Pownall at 4221 Florida Ave., Cincinnati 23, Ohio.

George L. Pownall


MODERN MARKETS KEEP VEGETABLES
GARDEN-FRESH, VITAMIN-RICH
These Same Vegetables HAVE BEEN PROTECTED WITH ICE SINCE MONDAY AM.
These Same Vegetables HAVE NOT BEEN PROTECTED WITH ICE SINCE MONDAY, 9 AM.
These Same Fruits HAVE BEEN PROTECTED WITH ICE SINCE MONDAY, 9 AM.

Front view of iced vegetable display shown by Central New York Ice Association at New York State Fair. Actual demonstrations and comparisons were made to show the high quality of vegetables and fruits when protected with ice.

Ice Association Presents Elaborate Display and Demonstration at State Fair

AN ELABORATE display of iced vegetables, ice, and ice-using equipment was shown at the New York State Fair at Syracuse, N. Y., September 5 to 10 by the Central New York Ice Association. It was a huge success. The attendance, which included 346,000 paid admissions, broke all records for a six day fair. Thousands of visitors were there from nearly every state in the Union and Canada. The ice display showed them what the ice industry has been trying to tell them, what ice men have been doing, and where they could buy ice-using equipment.

The iced vegetable display occupying 300 sq. ft. of space, was shown in the Horticulture Building, the largest on the grounds and in which exhibits are the best attended. Andy Andrich was there from the National Association of Ice Industries to give a practical demonstration on icing fresh vegetables in retail stores.

Sliced Vegetables Given Away

Background trim for the booth was obtained from the National Association of Ice Industries. Three large vegetable cases and two small salad display cases were used. The salad cases proved to be good attractions. Over 80 bushels of sliced carrots, tomatoes, celery, peppers, cucumbers, lemons, apples and even peaches were sliced and eaten off a bed of sparkling ice. Fourteen dozen heads of iceberg lettuce used as a garnish were eaten, besides a great quantity of radishes. People enjoyed the fresh, crisp vegetables and a frequent remark was, "I wish my grocer would have vegetables like that." One of the leading food stores in Syracuse ran an ad later in the week featuring "fresh vegetables on ice."

Across the aisle from the ice booth, the Onondaga County Vegetable Growers Association used two vegetable display cases, around which to build their first prize booth. Here again, Andy Andrich was most helpful in setting up and properly icing their exhibit. Very often, the Celery, Tomato or Onion Queen would cross over from Onondaga to the ice booth.

The National League of Fresh Fruits and Vegetable Distributors was very helpful in securing vegetables for the display and in addition made an outright donation of ten bushels.

Here are a few of the people who crowded into exhibit of Central New York Ice Association to get choice pieces of sliced vegetables or a drink of ice water.

Dr. A. J. Pratt, of the Agricultural College at Cornell, with the girl who won a contest on vegetable displaying, spent considerable time studying the display and the reaction of the crowds. Other officials and association men including Fletcher Smith of the National League of Fresh Fruit and Vegetable Distributors, and C. Chester Du Mond,

Commissioner of Agriculture and Markets, spent some time at the booth and showed a lot of interest in the exhibit.

Refrigerator Booth

Another booth in the Pure Food Building covered 400 sq. ft. just to the left of the entrance. It was a desirable location, well decorated with a royal blue background with block letters in silver. On display were a commercial refrigerator, bottle cooler, ice chest, rollaway hostess chest, domestic refrigerator, pressure type water cooler, picnic chest, and an ice cream freezer. Two bottle ice water coolers with free ice water were on tap at all times.

Display of refrigerators and other ice using equipment in Central New York Ice Association Booth.

A hexagonal case showing three sizes of cracked ice and a compartment of ice cubes, all under glass with colored lights under the ice and a well-lighted 300 lb. block of ice on a raised platform in the middle of the booth served to highlight the forms of ice as it is delivered to customers. Nine out of ten people would touch this cake of ice to see if it was real and if it was cold, and the place was swamped with people trying to get a free drink of ice water.

Probably the ice cream freezers and picnic chests aroused the most interest and several hundred of these could have been sold if they had been available. Many visitors also were interested in the refrigerators and chests and a number of inquiries were received on this equipment.

Don Lock Joins Equitable Paper Bag

THE Equitable Paper Bag Co. Inc., has announced the appointment of Don Lock to the position of sales engineer, Multi-Wall Division. His work will be devoted principally to the ice industry. He will give aid and assistance to ice companies in connection with their packaging problems and will assist in the development of their merchandise programs and methods.

A veteran of more than twenty years in various ice industry operations, Mr. Lock recently was manager for the Chicago District Ice Association of its ice refrigerator and appliance operations. Prior to that connection he was manager of the ice divisions respectively for the United States Cold Storage Co., and the Consumers Co. of Chicago. He has been prominent in ice merchandising circles over a period of years and has worked extensively with the State and National associations in the industry.

The Equitable Paper Bag Co. Inc., has just moved into a plant at Long Island City, N. Y., where the latest production equipment has been installed. In addition the company operates a large paper and bag mill at Orange, Texas. Mr. Lock will work out of the headquarters of the company at Long Island City but, for the present, will continue to reside in Chicago.

California Home Economists See How Ice Protects Perishable Foods

DURING the annual convention of the American Home Economists' Association held at San Francisco, Calif., June 28 through July 1, the National Association of Ice Industries maintained an ice industry exhibit in the San Francisco auditorium. This display was a part of the National Association's program to publicize ice during the national conventions of other associations who use or need ice refrigeration.

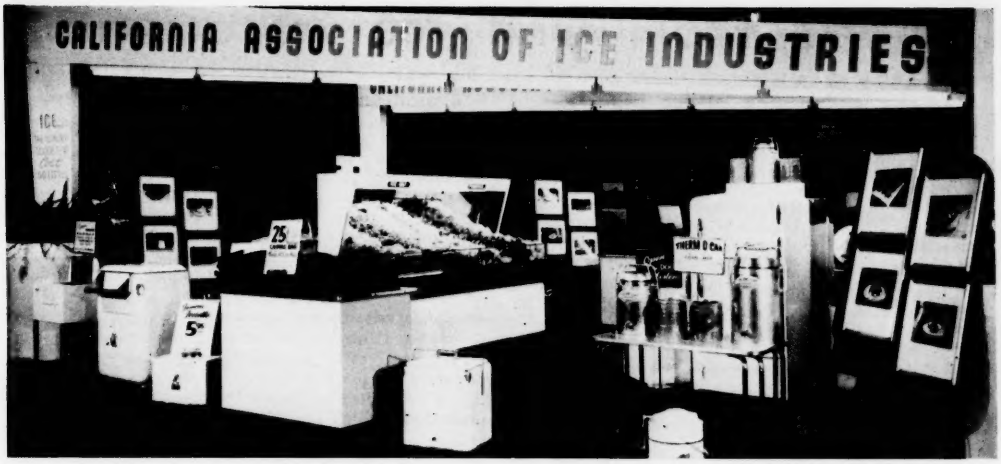
The exhibit was under the personal direction of Mary Pentland, public relations counsel of New York City. She was assisted by several California ice men including Arthur Stoker, Ken Sartori, R. W. Davis and Roy Simpson. Splendid cooperation was also rendered by Helen Goodrich, director of consumer service, Western Growers' Association and Mr. Puganucci of the Half Moon Produce Co., of San Francisco.

This display of ice and ice-using equipment was shown at the annual convention of the American Home Economists Association at San Francisco. Much interest was shown by the 1104 home economists who registered.

The theme of the exhibit was to accentuate the importance of ice to the country's economy and the indispensable role that it plays in protecting perishable foods and beverages. In the exhibit was displayed a home refrigerator, three open commercial display cases, two storage chests and a closed flower display case. The protective role of ice was demonstrated with open exhibits of fresh fish and poultry and vegetables displayed on crushed ice. Delicate corsages kept on ice in excellent condition were also displayed and were used as give-aways during the prize drawing the last day. Ice carvings and crushed ice centerpieces were used during the display.

Of the 1104 home economists from all parts of the country who registered at the ice booth, 322 left definite requests for printed literature about ice and its many essential uses. Iced food was served daily at the exhibit, a different food being featured each day. Spotlighted in turn were greens, fruits, beverages and fish. On the "greens" day, raw asparagus was served with a sauce of mayonnaise and mustard, salt and pepper. It was the first time that 90 percent of the taste-testers had ever heard of serving asparagus raw and the home economists ate up the last stick of the three crates of asparagus which was served on a centerpiece of crushed ice.

Two attractive and specially designed charts were displayed to demonstrate graphically the national annual use of ice in the homes, market places and transportation of the perishables which feed America. These charts told the story which, it is believed, made a lasting impression.



Front view of ice exhibit booth shown at Los Angeles County Fair, Pomona, Calif.

Ice Exhibit at Los Angeles County Fair Demonstrates Modern Needs for Ice

AN ICE exhibit under the auspices of the California Association of Ice Industries was shown at the Los Angeles County Fair, Pomona, Calif., September 16 to October 2. It was a tremendous success, with attendance close to a million people and more than half of that were clocked at the ice exhibit.

The construction of the ice booth was basically the same as was used in the Fair of 1948; however the color scheme was entirely different and certain partitions were eliminated to provide for more aisle space. Large cut-out letters "I C E" were added to the booth. The emphasis was on uses of crushed ice and ice cubes in the home and in commercial establishments, and particular attention was given to the iced vegetable story.

Equipment Sold at Booth

Utilized and sold at the booth were two household ice refrigerators, two ice chests, a picnic chest, an 8 ft. vegetable case, an ice cream freezer, three sizes Therm-O-Cans for holding ice water, iced tea or coffee, or other drinks; Kromex line of metal goods, including an ice cube bucket, an open ice cube bucket with tongs, and crushed iced water pitcher; a turret top display case specially designed for restaurants and florists; Garbison hostess chest and bar and Penguin Icerette and an "Ice Barrel" made of rubber for holding ice cubes on a hostess tray.

Approximately 8,000 small canvas bags for holding crushed ice and ice cubes were sold at the booth. A 6 ft. salad bar was kept continuously piled up with glistening clear ice cubes made at the booth with a small Hanson electric cuber.

All during the day and evening, demonstrations continued of crushed ice mold over a glass, for cool drinks. Small sand buckets were used for making these crushed ice molds, as well as the special mold that has been designed for this purpose by the Brown Derby chain of restaurants in Los Angeles.

Easels around the booth displayed framed color-photographs of exquisite ice services in the home. Orchid and carnation leis were flown in daily from Honolulu through the courtesy of the Pan American Air Lines, and were kept in perfect condition on crushed ice in the turret top case of the Marsh Equipment Co.

"Tel-a-Sale" talking machines of the George M. Wessells Co. were hidden in the ice refrigerators and started giving the message "The Talking Ice Refrigerator" each time the door was opened.

Three men were on duty at the booth each day, and four in the evening. Two lady demonstrators were at the booth in shifts between the hours of 10 a.m. and 10 p.m. to explain the uses and advantages of ice.

Literature Distributed

Literature given out at the booth included a booklet on the use of ice, one on commercial refrigeration with ice, and one on how to display the iced method way prepared by the Research and Engineering Department of the National Association of Ice Industries.

A list of all locations in Southern California where crushed ice and ice cubes can be purchased, was incorporated into a booklet and many thousands of these were given out.

Visitors Show Interest

The keen interest evidenced by the people coming to the booth, in the uses of ice, and the favorable comments made, were proof that the Ice Industry was materially helped, and that many people learned of the advantages of crushed ice and ice cubes in their homes, and where they could secure this form of ice.

The public response was splendid, and all of the ice manufacturers who attended the Fair and visited the ice booth expressed the same opinion—that it gave a great lift to the ice industry.

Reports From Unit Ice Associations

Indiana Association of Ice Industries

By Robert W. Walton, *Exec.-Secy.*

CURRENTLY the Indiana ice industry is placing considerable emphasis on combatting the new competition in form of automatic ice machines. We have utilized our Merchandising Forum district meetings to discuss ice makers and formulate plans to effectively meet this most serious threat to our commercial tonnage. We endeavor to keep the membership posted on all facts concerning new developments in the automatic ice machine field and of course, lean heavily on the valuable "Ammunition" provided by the National Association of Ice Industries. We feel that the ice industry is not as vulnerable as our competitors would like to make the public believe. However, it is necessary that we use our natural advantages intelligently, and through cooperative thinking and planning we can do much to retain this valuable tonnage.

Reports to the Association office indicate that 1949 will show a decline in ice sales in Indiana. We are naturally most concerned about this situation and the Association is taking steps to cooperate with the membership with positive action to forestall future slide in sales. We are planning a driver training program to be conducted by the Department of Distributive Education of Indiana University. The University is sending one of their staff members to the National Ice Marketing Institute where he will obtain first hand information on the Ice Industry and its problems. Working with Dan Prager of the National Association, we believe Indiana University's representative will be able to develop an extremely effective program for the Indiana Industry.

Secondly, as in the past, the Indiana Association offers sales promotion services to its members in terms of grocers meetings for vegetable icing, and public relations programs for civic clubs and social groups. These meetings are built around the film "Naturally Yours" and have proved most helpful in the past.

The industry is vitally interested in research and we hope that the future will provide us with more of this type of activity. There is a tremendous untapped field in perishable icing, which was borne out by the success of sweet corn research during the previous summer. We are anxious to exploit the perishable field further.

We feel that in the future more emphasis must be placed on merchandising and research. Our Association activities will develop toward holding tenaciously to our present markets and at the same time making every effort to develop new outlets for our product.

Delta States Ice Association

By R. N. Milling, *Secretary*

ONCE again Delta States' big event is "just around the corner!" And, as usual, we are planning for this convention to be bigger and better than ever. Biloxi is the playground of South Mississippi. For those who like sightseeing, there are many historical points of interest.

The convention committees are preparing a program to fit the needs of a buyer's market. The entertainment will be unique. While it is hoped that this year The Buena Vista will be able to house all of the delegates, it is suggested that all who are going make their reservations now.

Canadian Association of Ice Industries

By K. C. McCrea, Exec. Secy.

THE Canadian Association of Ice Industries has just completed its first major effort to promote vegetable icing in Canadian friut and produce stores. This effort took the form of a display at the Canadian Food Show in Toronto on October 3 and 4.

The display highlight of the coming convention to be held at the General Brock Hotel, Niagara Falls, Ontario, on November 8 and 9 and 10 will be the showing of two completely new lines of domestic ice refrigerators by two established Canadian refrigerator manufacturers.

Plans for 1950 Canadian National Ice Advertising to be presented for the first time at the Niagara Falls Convention are expected to call for increased advertising appropriation, increased local identification for campaign subscribers with the National Advertising, increased promotion of National Ice Refrigerator Week inaugurated for the first time this year and increased advertising material for campaign supporters.

Domestic use of ice will continue to receive major attention in the 1950 campaign, but there will be increased advertising support in Canadian trade papers for commercial ice and the newly formed Public Relations Committee, which works closely with the Advertising Committee, will have an increased budget to promote distribution of ice educational material in the form of moving pictures, booklets and speaker participation on Convention programs of other Associations.

Canadian ice sales during the month of September fell behind those of last year but it is now expected that total sales for the calendar year will show a very nice increase over 1948. Rapidly increasing Canadian population and heavy home building program is creating many new prospects for ice and generally speaking the economic health of Canada is sound.

Missouri Merchandising Forum

THE quarterly meeting of the Missouri Ice Manufacturers Association Merchandising Forum was held at the Missouri Hotel in Jefferson City, Missouri, Tuesday, October 4. President J. R. Dean, Pure Ice Co., Cape Girardeau, welcomed the 56 members in attendance and then turned the meeting over to C. F. Hood, Independence Ice & Creamery Co., Independence, Chairman of the Forum.

Discussions in which everyone participated were held on the following subjects: Training Your Employees, Selling Domestic Ice Applicances, Selling Commercial Ice Appliances, Rentals of Ice Using Equipment, and Ice Vending Equipment.

The United States Department of Interior film titled "Retailing Fish" was shown. In this film, ice is used exclusively and is recomended as the best method for the preservation of fish. It is highly recommended for use at Grocers meetings, and can be obtained free of charge from the United States Department of the Interior, Fish and Wildlife Service, Washington 25, D. C. Another film, "Introducing the New Worker to His Job" was shown. This film demonstrates the correct and incorrect ways of showing the new employe how to do his job.

The next meeting of the Merchandising Forum will be held during the Missouri Ice Manufacturers Association Convention in Kansas City, January 9-10-11, 1950.

Refrigerated Warehousing Industry

NEWS • ARTICLES • ANNOUNCEMENTS

NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES

Division of American Warehousemen's Association

Executive Offices:
Tower Building, Washington 5, D. C.

Secretary, W. M. O'Keefe
Executive Vice-pres., Wm. Dalton

President, Arthur N. Otis
New York, N. Y

Vice-president, Fred F. Alford
Dallas, Tex.

Treasurer, J. L. Gagini
Omaha, Nebr.

Annual Meeting Refrigeration Research Foundation

THE annual meeting of the Refrigeration Research Foundation will be held January 26-28, 1950 at the Edgewater Beach Hotel, Chicago. As usual this meeting will be held preceding the annual convention of the American Warehousemen's Association and the National Association of Refrigerated Warehouses which opens at the same hotel January 30.

Again the refrigerated warehousemen's part in the development of a national service of commodity refrigeration will be stressed. Technical improvments, new commodities and new, improved and expanded services will be focal points for the program. Last year the use of technical facts in salesmanship occupied the attention of the members, while this year technology's place in continued development will receive emphasis.

Tentative plans will include papers by Bernard E. Proctor on "New Applications of Refrigeration and Refrigerated Warehousing;" Burgess Jennings on "Low Temperature Psychometry," and specialists on "Air Purification in Cold Storages."

The Scientific Advisory Council will meet January 26. All members are invited to attend the discussions at this meeting of developments in refrigeration research. Technical and business meetings will occupy the other two days.

Eighth International Congress of Refrigeration Proposed for 1951

AT THE first postwar meeting of the Technical Board of the Institut International du Froid, Paris, France, held May 2-5, 1949, at Louvain, Belgium, the Board passed resolutions recommending the postponement of the Eighth International Congress of Refrigeration until 1951, to permit more time for preparation and to enable American interests to participate in the Congress. The second resolution suggested that the Congress be held in Sweden or England on the occasion of the centenary celebration of two illustrious British scientists, James Prescott and Lord Kelvin, who pioneered in low temperature work.

The Technical Board reviewed and revised the general agenda established for the Eighth Congress, which was originally drawn up by the Technical Board during the London meeting in 1937, and the refrigeration days at Karlsruhe and Baden-Baden, in 1939. Delegates from Belgium, Denmark, France, Great Britain, Holland, Italy and Sweden attended the Conference.

NARW Bulletin Says More "Unimals" Are Needed for Balanced Farm Program

A WELL balanced farm program is essential to the health and well being of the American people. This is the theme of a pamphlet entitled "This Is The Unimal", now being distributed by the National Association of Refrigerated Warehouses to its members in the interests of a sound agricultural economy. A 'Unimal' is the creation of an imaginative artist who envisaged the source of America's meat and poultry supplies as a composite animal-part cattle, hog, sheep and fowl. The unimal is a vital source of the foods which nutritionists agree we, as a nation, should be eating more of.

Because in the past the stress has been on grains, we now have large excesses of this commodity for which some useful outlet should be found. Burning this excess fuel or hoarding it in dead storage is wasteful. One solution lies in converting this surplus to more nutritious foods by feeding it to livestock.

"The relationship between a country's food producing livestock and its human population is extremely important to the welfare of that nation. In short, the man-unimal relation is one of the most significant figures in the world's present-day economy"—and this ratio is on the decline.

To achieve the needed balance in our farm economy more stress needs to be placed on the types of foods that go into the housewife's refrigerator, meats, poultry, eggs, milk, etc. Greater consumption of these nutritious foods will provide a bigger market for our surplus grain, according to the pamphlet.

AWA Year Book Distributed

THE American Warehousemen's Association Year Book for 1948 with proceedings of the 58th annual meeting held at San Francisco, Calif., February 7-10, 1949, has been distributed to members of the AWA and the National Association of Refrigerated Warehouses. It contains a full report of the annual meeting, list of members of the association, list of officers and directors, and other information of value to the industry.

This Year Book provides a valuable source of reference for all members of the American Warehousemen's Association including the two affiliated Divisions, the Association of Refrigerated Warehouses and the Merchandise Division. Complete proceedings of the annual meetings of these two Divisions are included.

Refrigerated Warehousing Industry

Milwaukee Warehouse Strike Settled

FINAL settlement of the Milwaukee warehouse employee's strike has been announced with acceptance by the workers of what amounts to 13 cents an hour wage increase. The three-man board of arbitration returned a spilt (2 to 1) ruling in favor of the unions.

The union struck for seven cents increase, later raising their demands to fifteen cents with maintenance of a guaranteed 44 hour work week. The board of arbitration reduced the guaranteed work week from 44 to 42 hours and awarded eight cents per hour increase to maintain the same take-home pay for 42 hours as had been paid for 44 hours. In addition the board awarded an hourly increase of approximately five cents per hour. The total increase of thirteen cents was ordered rectroactive to April 15 only on 42 hours work in each week. The base pay in the cold storage industry in Milwaukee had been $1.18.

The board's decision was two to one, the industry member of the board dissenting. The industry member took the view that any increase in the hourly rate that is made should be offset by a reduction in the guaranteed work week. He therefore agreed with the eight cents increase and the reduction in the work week, thus maintaining the same take-home pay. He opposed, however, any increase in the take-home pay because Milwaukee's take-home pay is equal to or greater than the take-home pay in the major competitive cities such as Minneapolis and Chicago. His views reflected the industry's own views.

The arbitration board further ruled that 42 hours of guaranteed work must be worked in any five consecutive days in any work week—that is Monday through Friday or Tuesday through Saturday, etc.

Canadian Cold Storage Holdings

THE Dominion Bureau of Statistics of Canada, Agricultural Branch, reports the following commodities held in cold storage on September 1, 1949 as compared with September 1, 1948 and August 1, 1949.

Apples in cold storage on September 1, 1949 amounted to 25,211 bu. as compared with 14,504 bu. September 1, 1948 and 9,073 bu. August 1, 1949.

Frozen fruit holdings in storages and factories September 1, 1949 amounted to 17,681,000 lbs. as compared with 20,532,000 lbs. September 1, 1948 nad 16,774,000 lbs. August 1, 1949.

Stocks of frozen vegetables in storages and factories on September 1, 1949 amounted to 6,292,000 lbs. as compared to 6,848,000 lbs. September 1, 1948, and 4,323,000 lbs. August 1, 1949.

German Authority Cites Refrigeration Research Foundation

A COMPLIMENTARY comment on the work of The Refrigeration Research Foundation was published recently by Dr. Rudolf Plank, internationally recognized authority on refrigeration. In the new German refrigeration Journal "Kaltetechnik" Dr. Plank mentions editorially the large attention being given to refrigeration in same advanced countries and added this statement: "The Refrigeration Research Foundation and the Cold Storage Advisory Committee provide continued rate of research and rapid transference of its findings to industrial practice." The significance of this statement is recognition of TRRF'S ability to bring research to bear quickly on industrial problems.

Refrigeration Research on Candies

A RESEARCH project on cold storage of representative types of candies conducted by The Refrigeration Research Foundation is now underway at the Georgia Agricultural Experiment Station under the leadership of J. G. Woodroof. The National Confectioner's Association is cooperating with the Georgia Experiment Station and TRRF. Thirteen types of candy by NCA experts and made according to specified formulae will be included in the tests which will cover various temperatures including freezer storage and various humidities.

Another Refrigeration Research Foundation project on refrigeration of peanuts and pecans for making candies the year around has now been approved. Like the one on representative types of candies, it is cooperative with the National Confectioners Association and will be conducted by Dr. Woodroof at the Georgia Agricultural Experiment Station. Launching of this project has followed several conferences with the Research Committe of the National Confectioners Association, and the excellent planning encourages the belief that valuable results will be forthcoming from this study.

Storage of nuts to be made into coated and uncoated candy bars to be held at five different temperatures including freezing and four humidities is included in the general formula.

Commodity Credit Corp. Terminates Lease on Bronx Market

THE Commodity Credit Corporation has announced that it will terminate its lease on the Municipal Terminal Market, at Bronx, N. Y., as of October 8. In making the announcement, Ralph S. Trigg, CCC President, said:

"Termination of the lease on this large cold-storage warehouse is in line with CCC's policy of utilizing, to the fullest extent possible, private facilities and normal channels of trade in carrying on its operations. During the war and for some time after the war, the Government needed the assurance that refrigerated warehouse space would be available for perishable commodities in the New York area. But with adequate commercial cold storage space now available in the area, the Corporation is terminating the rental of the Bronx facilities."

The original lease on the market, owned by the City of New York, was signed July 28, 1942, and called for an annual rental of $270,000. On February 1, 1946, the lease was amended providing for reduction of the annual rental to $230,000.

Capacity of the Bronx warehouse is approximately 950 carloads. About 200 carloads of Government-owned commodities, butter, dry skim milk, and dried eggs, have been moved to commercial warehouses in the metropolitan area or direct to government program outlets.

Green Coffee Storage

ON A SHORT term investigation of coffee at Purdue University, sponsored by The Refrigeration Research Foundation, Dr. C. E. Baker is preparing a report in collaboration with M. L. Ashenbrenner of Great Lakes Terminal Co., and Ralph Bruchsieker of Woolson Spice Co., Toledo, who have expedited and carried on this important work. The report will show that certain higher grades of blending coffee are especially benefitted by refrigerated storage at 32° F. and 75 per cent relative humidity. Further work is in progress to define the humidity requirements more precisely.

Cold Storage Holdings—Cooler Occupancy Up, Freezers Continue Below Normal

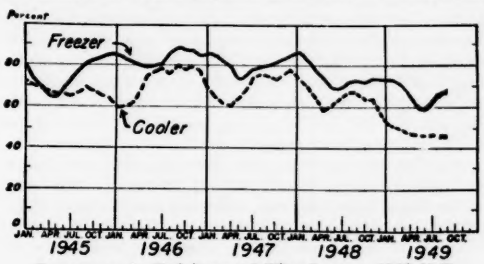
IN all regions, except the West South Central, Mountain and Pacific, public cooler occupancy increased during September. On the first of October the national average occupancy in all public cooler space was 60 per cent, up 7 points since last month. This increase was in contrast to a drop of 2 points in September occupancy recorded for the five-year period ended 1948. For the first time since last July public cooler occupancy was above the record lows of 1940.

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC, PRIVATE AND SEMI-PRIVATE WAREHOUSES, APPLE HOUSES AND MEAT PACKING PLANTS (000 LBS.)

	Oct. 1, 1949	Sept. 1, 1949	Oct. 1, 1948	Five-year Average
Meat and meat products, lbs.	357,648	451,368	394,970	423,755
Lard and rendered pork fat, lbs.	47,603	68,819	96,587	95,887
Frozen poultry, lbs.	130,044	83,466	108,368	168,781
Creamery butter, lbs.	153,001	153,855	93,850	114,971
American cheese, lbs.	186,206	183,208	182,449	169,047
Other cheese, lbs.	21,149	23,977	25,145	23,835
Shell eggs, cases	818	1,426	3,290	4,197
Frozen eggs, lbs.	121,289	146,868	200,968	232,150
Apples, bu.	13,756	412	4,724	7,665
Frozen fruits, lbs.	354,286	339,588	364,115	385,428
Frozen vegetables, lbs.	368,717	315,788	311,734	270,018
Frozen fish, lbs.	148,998	146,344	140,161	136,351

Freezer space in public warehouses was 67 per cent filled on October 1. Unlike cooler occupancy, utilization of freezer space for the fourth time in succession reached a new record low for the month. Despite an increase in occupancy of 1 point since last month, public freezer space occupancy was still below the record October 1940 low by 2 points. Increased freezer occupancy was reported in several regions, but in the West North Central, South Atlantic, and West South Central areas occupancy decreased. In such cities as Detroit, Milwaukee, Minneapolis, and Nashville, both coolers and freezers in public warehouses were more than 80 per cent filled. On the average, however, public refrigerated warehouses in key cities were 53 and 66 per cent filled for coolers and freezers, respectively.

The harvesting and storing of fresh apples during September increased cooler foodstuffs in storage to 2 billion pounds. This time last year cooler-held commodities amounted to 1.7 billion pounds. Except for the fresh apples,



Occupancy in Refrigerated Warehouses, 1945-1949

dried eggs and cheese moving into storage, all other cooler commodities showed net decreases in stocks. The net gain in cooler weight since last month was 412 million pounds which was more than twice the net increase this time last year. Commodities in freezer storage totaled 1.5 billion pounds on October 1, thus reflecting an increase of 28 million pounds since last month. The net gain was primarily in such food items as frozen fruits, vegetables, poultry, and selected meat items as selected withdrawals of pork and frozen eggs countered the into-storage movement of other freezer items.

TABLE II—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		Oct. 1, 1949 (%)		Sept. 1, 1948 (%)		Oct. 1, 1948 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	3,053	1,917	63	75	40	74	48	58	68	80
Middle Atlantic	40,413	22,419	55	68	43	67	57	74	68	86
East North Central	27,220	17,623	65	65	56	62	71	73	75	80
West North Central	10,311	7,738	75	61	68	63	76	71	78	81
South Atlantic	8,551	4,362	51	72	50	73	65	70	70	80
East South Central	4,528	3,298	73	84	68	81	79	84	80	79
West South Central	6,953	3,784	54	47	57	49	64	57	71	76
Mountain	1,592	778	49	64	60	68	69	73	77	89
Pacific	17,103	10,173	59	71	62	69	59	71	73	83
United States	119,724	72,092	60	67	53	66	64	71	72	82

October 1 holdings of fresh apples and pears totaled 14 and 5 million bushels respectively. Stocks of these fresh fruits were greater than the stocks of a year ago, but only fresh apples were above average for this time of year. Frozen fruits in storage increased 15 million pounds over last month. The 354 million pounds in storage were below

TABLE III—PERCENTAGE OF SPACE OCCUPIED BY PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS (APPLE HOUSES EXCLUDED)

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent Oct. 1, 1949		Space Occupied—Per Cent Sept. 1, 1949		Net Piling Space (000 Cu. Ft.)		Space Occupied Oct. 1, 1949		Space Occupied Sept. 1, 1949	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	1,350	545	90	91	49	51						
Middle Atlantic	3,091	2,095	54	46	34	44	1,952	423	86	58	83	62
East North Central	3,192	1,610	82	48	63	41	4,547	1,495	83	80	84	83
West North Central	752	2,546	87	94	91	93	20,608	7,010	86	68	85	77
South Atlantic	358	449	35	91	7	89	1,451	242	86	98	80	98
East South Central							403	100	82	91	81	91
West South Central	378	87	29	29	25	30	2,825	517	97	100	77	100
Mountain	170	636	84	71	86	64	421	366	99	100	86	98
Pacific	3,476	3,369	35	86	33	81	2,835	595	89	95	91	91
United States	12,768	11,337	61	74	45	69	35,042	10,746	87	74	85	81

NOTE: Blank spaces indicate that insufficient returns were received.

the average October 1 holdings by 31 million pounds and were below last year's holdings by 10 million pounds. During the month there were increases in holdings of frozen apples, blackberries, blueberries, grapes, peaches, plums, prunes, and fruit juices.

A net into-storage of 53 million pounds of frozen vegetables during September raised total stocks on hand to 369 million pounds on the first of this month. Last year this time there was a net increase of 45 million pounds, bringing total on hand to 312 million pounds. The average increase for frozen vegetables this year was 28 million pounds. Frozen lima beans and sweet corn showed significant increases in stocks since last month; the former increased by 29 million pounds and the latter by 10 million pounds. Frozen green peas showed the greatest net decrease, 9 million pounds moved from storage leaving 124 million pounds on hand October 1.

Creamery butter in storage totaled 153 million pounds on the first of this month. Almost half of the total butter in storage was in the West North Central region. Creamery butter was almost unchanged from last month and by comparison was 59 million pounds greater than stocks a year ago, and exceeded the average October 1 holdings by 38 million pounds.

American cheese in the East North Central and Middle Atlantic areas comprised almost three-fourths of the total American cheddar in storage. On October 1, American cheddar cheese totaled 186 million pounds; other varieties amounted to 25 million pounds. During September, there was a net increase of 3 million pounds of cheddar cheese which is in contrast to a decrease reported last year this time and during the five-year period ended October 1, 1948.

Frozen poultry showed marked gains during September with a net increase of 47 million pounds over last month. This net gain was more than twice the average increase for this time of year, but poultry in storage was still below average by 39 million pounds. The largest gains in poultry holdings occurred in the East and West North Central regions where almost one-half of the frozen poultry was reported in storage.

Shell eggs amounted to 818 thousand cases on October 1, a decrease of approximately 600 thousand cases since last month. Frozen eggs, likewise, decreased and totaled 121 million pounds on the first of this month. The net decrease of 26 million pounds of frozen eggs during September was about average for this time of year, but was below the withdrawals of a year ago. Present holdings of frozen eggs were about half the stocks in storage last year and the average October 1 holdings for the five-year period ended 1948.

Meats in storage were the second lowest October 1 on record. Total stocks in storage were 358 million pounds, 130 million pounds greater than the record low of October 1946. Net withdrawals during September amounted to 93 million pounds, which was below average. Beef stocks were reduced by 3 million pounds, leaving 62 million pounds on hand October 1. Pork, all classes, totaled 202 million pounds. Last year this date 235 million pounds were in storage, while the average October 1 holdings was 220 million pounds. Countering the net withdrawals of the major meat items were slight gains in storage stocks of veal, lamb and mutton. Lard and rendered pork fat stocks were reduced by 21 million pounds since last month, leaving 48 million pounds on hand October 1—almost half the stocks of a year ago.

A net into-storage movement during September of 3 million pounds of frozen fishery products brought total stocks on hand to 149 million pounds. Cured fishery products in storage on October 1 totaled 29 million pounds. Of the total frozen fish in storage 122 million pounds were salt-water species, 9 million pounds fresh-water species, and 18 million pounds shellfish.

Storage Outlook

Accompanying the seasonal increase of both cooler and freezer weights were noticeable gains in occupancy in many regions of the Nation. Particularly was this true for public coolers where the increase over last month was the greatest September gain on record. Fresh apples moving into storage contributed largely to the increased occupancy evidenced during the month and from past records there should be even further increases as the apple storage crop reaches its peak. Normally, cooler occupancy should be at its peak next month; the average November 1 occupancy being from 1 to 3 points greater than the preceding month. Freezer-held commodities were about equal to the volume reported in storage a year ago, but were less than stocks on hand this date during the four-year period ended 1947. Generally, the volume of foodstuffs in freezer storage shows only slight gains between now and November 1. Last year public freezer occupancy increased one point from October to November, but during the five-year period ended 1948, the average occupancy on November 1 was unchanged from the previous month.

Editor's Note: To provide current information on cold storage holdings provided by the Production and Marketing Administration of the U. S. Department of Agriculture, the figures as of October 1, 1949 are published in this issue. The figures as of September 1, which would normally be published in this issue, have been omitted.

Cold Storage Stocks of Frozen Fruits and Vegetables

APPROXIMATELY two-thirds of the 123 million pounds of frozen peaches, raspberries and strawberries in storage September 1 were classified as to container size. One-third of the 83 million pounds classified were reported to be in containers of 1 pound or less. The proportion of raspberries in consumer-sized packages continued to rise with 21 per cent of the stocks reported to be in this type package. The percentage of strawberries in retail containers showed a slight increase from 38 per cent on August 1 to 39 per cent on September 1 while consumer-sized packages of peaches decreased 3 points to 34 per cent.

STORAGE STOCKS OF FROZEN FRUITS AND VEGETABLES IN STORAGE SEPTEMBER 1 AND AUGUST 1, 1949 IN PACKAGES OF ONE POUND OR LESS (000 OMITTED)

	September 1, 1949		August 1, 1949	
	lbs.	pct.	lbs.	pct.
Peaches	2,328	34	1,880	37
Raspberries	5,114	21	3,566	14
Strawberries	20,144	39	20,868	38
Asparagus	4,177	74	4,983	77
Beans, lima	10,112	59	9,247	62
Beans, snap	20,224	69	6,369	62
Corn, sweet	4,892	35	1,909	65
Peas, green	42,102	57	38,105	54
Spinach	7,871	79	9,623	77

September 1 holdings of the selected frozen vegetable items totaled 270 million pounds. Fifty-five per cent of this amount were classified as to container size which compares with a coverage of 61 per cent last month. Sweet corn showed a sharp decrease in the percentage of retail packages with 35 per cent reported to be in packages of 1 pound or less. Asparagus and lima beans each decreased 3 points in the percentage of retail packages of stocks classified while snap beans, peas and spinach increased 7, 3 and 2 points respectively. On September 1, 69 per cent of the snap beans, 57 per cent of the peas and 79 per cent of the spinach were in consumer-sized packages.

The Reactivation of Carbon Filters In Cold Storage Plants

WHILE the use of activated carbon for filtering air in fruit and other warehouses and in other air conditioning applications is increasing, there is a problem involved in its reactivation. This subject is discussed in a report which has been issued by Research Advisory Service, Portland, Ore.

The following question was submitted by a correspondent:

"We have just installed a complete carbon filter system within our orchard cold storage plant. The storage capacity is 350,000 boxes of apples. In order to get the full benefit of the activated carbon we built the screens in a battery, detouring the return air. We use a brine spray system for cooling. Our problem at present is how to reactivate the carbon economically. Any information you could furnish us concerning a practical method would indeed be appreciated."

From A. Van Doren, Associate Professor of Horticulture, Institute of Agricultural Sciences, The State College of Washington, Pullman, Wash.:

"Among the various types of adsorbents, activated coconut shell carbon of granular size 6 to 14 mesh, has been found to be the most practical for use in fruit cold storage plants. The reason for this being that it is the best adsorbent of the odorous gases which we wish to reduce in volume in the fruit storages. In addition to being the best adsorbent it has characteristics which make it far superior than many other types of activated carbon during the reactivation processes.

The Reactivation Process

"When the carbon has reached its practical saturation in service it must be removed for reactivation. As the retentive capacity of the carbon is in inverse ratio to the temperature to which it is exposed, reactivation consists essentially of applying heat continuously in increasing amounts or gradually raising the temperature of the carbon until it has given up all of the adsorbed gases and vapors. The ultimate temperature necessary will depend upon the boiling point and critical temperature of the adsorbed substances. An ultimate temperature of about 1,000 degrees F., is usually required to completely release all of the gases and vapors accumulated by the carbon in ventilating service.

"The reactivating process is, therefore, meticulous, requiring special equipment and careful operation to control the gradual application of heat in the absence of air and the proper separation and disposal of the concentrated volatiles released by the carbon. Here, again, the importance of carbon quality is paramount. Carbon processed to strict specifications will possess adequate durability to withstand repeated reactivation without loss or deterioration.

"The Carbide and Carbon Chemicals Corp., of 30 East 42nd St., New York, 17, N. Y., have facilities for reactivation and will guarantee returning to you carbon of the same quality and specification which you sent to them. Certain other less scrupulous reactivators are less inclined to return you the same grade and quality of carbon which you sent and may even replace your carbon with a pecan shell or wanut shell carbon which may have somewhat different specifications."

From Elmer Hansen, Horticulturist, School of Agriculture, Oregon State College, Corvallis, Ore.:

"The only method for the reactivation of carbon, so far as I am aware, is by super-heating with steam at very high temperatures, in excess of 1000 F. At the present time it is necessary to send the charcoal back east to the manufacturers for reactivation, since there apparently is no concern on the Pacific Coast equipped to offer this service. This is a real problem where a ton or more of carbon is involved.

"I know of no way whereby a grower or storage operator could carry out this process. The increased use of carbon in the air purification of storage plants and for other phases of air conditioning on the Pacific Coast would appear to require that facilities be established for reactivation in this area."

From A. B. Ray, sales manager, Special Products Division, Carbide and Carbon Chemicals Corp. New York, 17, N. Y.

"It appears that your problem is the reactivation of activated carbon used for the removal of objectionable impurities from air in fruit storage warehouses. The carbon so used can usually be reactivated by treatment with superheated steam at a temperature sufficient to remove the adsorbed impurities. This treatment requires special equipment and is usually done by the supplier of the carbon or the complete equipment in which the carbon is used. We suggest that you refer the user of the carbon to the supplier of his carbon or the complete equipment if complete equipment containing carbon has been purchased."

From J. William Zabor, Director of Development, Pittsburgh Coke & Chemical Co., Pittsburgh, Pa.:

"The answer to the problem of regeneration of activated carbon depends almost entirely upon the material adsorbed. In many cases, the adsorbate can be washed from the carbon by using a solvent in which the adsorbate is highly soluble. The occluded solvent can either be displaced or washed out with water or vaporized with steam. The most common method for regenerating carbon used in fruit cold storage plants is a direct regeneration with steam without the use of any intermediate solvent extraction. The temperature of the steam required depends upon the material adsorbed. It is possible to regenerate by heating the carbon with heat from sources other than steam, but there is naturally considerable hazard involved if this is done in the presence of air.

"The W. B. Connor Engineering Corp., New York City, have been pioneers in the use of activated carbon filters in cold storage plants, particularly those used for apple storage. I am sure you would find them more experienced and expert than we are, and I would, therefore, suggest that you direct an inquiry to them."

From W. B. Connor, president, W. B. Connor Engineering Corp., New York 16, N. Y.:

"Please be advised that carbon such as is described by the inquirer and which has been used for air purification in an apple storage plant must be reactivated with superheated steam at a temperature of about 1100 degrees F., for a period of eight hours. This is a task requiring considerable knowledge, skill and experience and the service is generally rendered by the seller of the carbon. It is doubtful that the job can be done on a 'home-made' basis.

Storage of Candy

THE Refrigeration Research Foundation is now sponsoring two projects on candy storage at Georgia Agricultural Experiment Station in collaboration with the National Confectioners Association. The investigation will cover 13 types of candies at five temperatures and four humidities and on storage of peanuts and pecans for use in candies.

Under a short term project at Columbia University the Foundation is searching for information on better ways for removal of products from low to room temperature. It seems probable that lower temperature (if feasible) would mean better candy, particularly candies with certain ingredients.

Letters from members of the candy and warehouse trades have supplied much information of value on the subject of candy storage. An official of one company (a manufacturer) has written as follows:

"To spread employment and to prepare for the Fall rush. we manufacture a lot of chocolate in the summer. This necessitates cool, air conditioned storage, and we find 60-68 F., with R.H. close to 50 per cent, most satisfactory. At these temperatures cocoa butter remains hard and some desirable changes take place in the chocolate. These storage conditions also remove danger of sweating on removal from cold storage, which is especially great for chocolate-coated candy. At high humidity chocolate picks up musty odors from packing material, even though it may not get moldy. Uniformity of temperature is also very important since varying temperatures encourage so-called 'fat bloom.'

A representative of a TRRF-member storage company has recently reviewed in correspondence their experience over a period of years, in which success was achieved by close cooperation with manufacturers. During this period packaging improved and manufacturers also made changes in the product. Temperatures considerably lower than the 60's have been used for some products, and relative humidity has always been kept low. Careful attention has been given the condensation problem.

Many followed the common recommendation of temperatures in the 60's and a relative humidity of 50 per cent. These conditions are recommended by the Data Book of the American Society of Refrigerating Engineers. Despite occasional difficulty, for example in maintenance of low humidity, success, generally speaking, has been achieved. Confectioners are interested in improvements in their products, in nutritive factors and in quality generally, and it is possible that changes and improvements in candy storage will be necessary and possible in the future.

Summary

1. There are many types of candy, the chief ingredients of which are sugars, chocolate, fats, milk or milk products, nuts, fruits, honey, coconut, flavorings, gums and others. Packaging varies in ability to exclude moisture vapor.

2. Because of the many types of candies and packaging materials, manufacturers' recommendations are important. Often they have investigated storage requirements of their products. Tests and experience are safe guides.

3. Recommendations generally range from 50 to 70 F., with low relative humidity (50-60 per cent). A survey by National Confectioners Association (Phip. P. Gott, president) of storage practices revealed these wide variations—possibly due in part to climatological factors in various regions.

4. Low relative humidity is important, for the sugar, chocolate, dried fruit and other ingredients that readily pick up moisture.

5. Low temperature, or avoidance of high temperature, is important for nuts, fats, etc., but there is always danger from condensation on removal from lower to higher temperatures. Consequently temperatures in the 60's are most common. Some, however, are storing at lower temperatures.

6. There is need for new research. TRRF and the National Confectioners Association are jointly sponsoring research now, on a wide range of temperature and humidity, including freezing temperatures.

Storage of Fresh Citrus Fruits

DEFINITE recommendations can now be made on the storage of fresh citrus fruits based on two years' work under the direction of The Refrigeration Research Foundation. Texas and Florida Valencias, harvested before they are over mature, wrapped and packed in standard boxes and held at 32° F. with relative humidity of 85 per cent can be expected to keep for as long as three to four months. Decay has not averaged more than 5 per cent for this period and the fruit, therefore, has been well preserved. Use without extensive delay following removal from cold storage is necessary and frequent inspection is advisable.

Rind defects vs. decay has been a problem for lemons and recent commercial experience has indicated that a higher temperature of 45-60° F. which avoids rind injury is not always to be preferred over 37° F. which protects against decay but does permit development of other rind defects. A similar fact for grapefruit has become apparent. The long stored fruits developed some rind defects but the fruit itself was as edible as any other.

"Baby, It's Cold Inside" this cold storage room when the thermometer outside registered in the 90's. Dorothy Jewell, 19-year old stenographer, selected by icemen of the Crystal Ice & Cold Storage Co. of Phoenix, Ariz., a subsidiary of City Products Corp. of Chicago, posed briefly for this picture.

The Practical Refrigerating Engineer
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QUESTIONS AND ANSWERS

Economics of Refrigeration

National Association Practical Refrigerating Engineers

PRESIDENT
GEORGE KOEHNE
Tulsa, Okla

SECRETARY
EMERSON A. BRANDT

Executive Offices:
435 North Waller Ave.
Chicago 44, Ill.

By Glenn Dodson

President, Security Warehouse & Cold Storage Co., San Jose, Calif.

THE SUBJECT assigned to me is Economics of Refrigeration. This is a very general title and for a time I was perplexed to know what aspect of the subject you would be most interested in. I was given a hint by one of the gentlemen present when he said that many times men come up with what they believe are very good ideas on the improvement of equipment or processes which are turned down by the management, and it was desired to know what considerations enter into the decision whether to adopt the suggestion or pass it up. It might be that in the course of my talk I can give you some of the answers. However, in discussing this subject, I shall limit myself principally to a discussion of the financial or capital aspect rather than to engineering details and operating costs of specific plants or types of equipment. The reason for this is that you gentlemen are practical refrigerating engineers, which I am not, and certainly know much more about the practical application of any item of equipment than I do. My knowledge is limited more to finance, investments and profit and loss in general.

The first general heading under which I wish to talk is the place of machines in our civilization and how they influence the standard of living. You all know from observation that there has been a great advance in America in the use of machinery, the development of new processes, the discovery of new chemicals, all of which have added not only to the number of units of any particular item of useful goods produced, but have also tremendously increased the variety of useful items available. In the lifetime of each of us we have seen these improvements and are now using many products that were not available five-ten-fifteen-thirty or forty years ago. This has all been accomplished by the use of new machines, new processes, new techniques and improvements of all kinds in our industrial plant. The significance of these advances has been that more work has been accomplished by fewer men in shorter hours, with time left over for the development and production of a broader range of products to satisfy the demands of the American people. If we had not had these technical advances we would be where we were one hundred years ago, all working long hours and enjoying only the bare necessities of life with very little leisure time for pleasures. In those days it was only a few of the richer who enjoyed the use of the restricted variety of goods available then.

Presented to San Jose Chapter, NAPRE.

Mechanical Development

In order to show the extent of this development in the use of machines I have some figures to quote relative to the capital invested per worker at various times throughout the last fifty years. In 1850 the average amount of capital invested per worker was $557. By 1900 this had increased to $1850. By 1920 the amount was almost $5000. In 1930 it was about $6200 and at the present time it is estimated to be about $7000.

During this same period of time the gross annual value of product per worker has increased very materially as shown by the following figures. The gross annual value of product per worker in 1850 was about $1100. By 1900 it was about $2500. In 1930 it had increased to about $8200. In 1940 it had dropped back to about $7200. At the present time the gross annual value of product per worker is probably somewhere in the vicinity of $8500 to $9000.

From the two sets of figures I have quoted you will note that the capital invested per worker in one hundred years increased about 11½ fold; whereas, the gross annual product per worker increased little more than 8 fold. So it can be seen that improved machinery and techniques do not increase the product produced in direct proportion to the additional investment made. Probably the reason for this is the fact that machines are operated less and less time because of the reduction in the work day.

While talking about the average amount of capital invested per worker and industry in general in the United States, I would like to point out the significant fact that, although the national average is approximately $7000, the investment per worker in the cold storage and ice industry is closer to $20,000.

Since 1914 the efficiency of labor has increased 2.7 times. Taking 1939 as 100, the units produced per man in 1914 were 44. In 1945 they were 120.

Have you ever stopped to consider what are the basic elements of costs in new products whether it be consumer goods or capital equipment?

Let's take a compressor as an example. A compressor is constructed principally of iron. Iron originates in the

mountains. This ore is transported to a blast furnace and made into pig iron. Some of the iron is cast into cylinder blocks, etc. Some is made into steel, which makes up other parts of the compressor. Skilled men are assigned to the task of boring, drilling, forging and forming the different parts which are later assembled into the completed machine at the factory. Salesmen go out and sell the product and it is shipped to the customer who has to install it and put it into operation. Its operations and maintenance is in charge of men skilled in the task. Its power is an electric motor which has come through somewhat the same process in its original construction and delivery as the compressor. Its fuel is electricity which originates from large generators which have been installed and which are operated by men. The point I am trying to make is that the final product received by the consumer is basically made up of labor, although not all labor.

Many people believe that all values of plant machinery and merchandise of all kinds are labor. This is not true as I will try to show. There is another very important cost that goes into such products. Some people call it waiting time. Nothing can be produced without capital. Capital is accumulated savings and is applied to the development of plants, machinery, transportation equipment and all of the other items that go into the mining, transportation, fabrication, warehousing and selling of all products. The economists call it waiting time because the person who accumulates savings is usually willing to rent them out and wait for the return of the money for a charge. If it wasn't for the accumulation of these savings and the willingness of people to let others use them, there could be no industrial progress.

Discovery Value of Resources

Another cost that is not a large factor in the total value of output is discovery value of natural resources. Every person that discovers an ore mine, an oil well or a power site and has the title to it hopes to obtain a profit over and above the value of the actual work he performed in locating such a natural resource. We would all like to discover oil under our own property because we know we are entitled to a profit because of our ownership of that property.

I have figures going back to 1900 which show that the workers share of the gross value of the output of the average company has ranged between 16 and 17.9. In other words, the amount of labor going into a product in the average company amounts to about 17 per cent of the sales value of that product. However, the product of any individual company is made up of products of other companies and transportation costs, amounting to about 17 per cent of the value of product or service in each instance. The result is that, on the average, the total amount of net new spending power that goes into labor and salaries of all kinds tends to be approximately 64½ per cent regardless of whether the government takes a major or minor role in the control of business, whether labor puts on a drive for higher wages or whether business conditions are good or bad. I have checked over figures for a long period of time and have noted that the average share of labor and salaries in net new spending power has been 64½ per cent with some fluctuation up towards 70 per cent and some fluctuation down towards 60 per cent. The balance, or 35½ per cent, apparently goes to waiting time and discovery value of natural resources.

Whereas the average share of labor in the gross value of the output of industry in the United States is approximately 17 per cent, a study of the reports of several cold storage companies would indicate that in the case of this industry wages and salaries take 45 to 50 per cent of the sales dollar.

Basis of Investment

The second heading on which I wish to talk is more specific. It might be stated thus. What do the investors and management think about when they are considering an investment in a new plant or in a new piece of equipment? Whether it is cold storage, ice, or any other kind of industry, approximately the same things must be taken into consideration.

It has been suggested that a company expand its facilities or build a new plant. It would be foolish to embark upon the project just because the current plant and facilities are making a profit. I remember very clearly what happened to a company which happened to be in the agricultural business. What happens to agriculture can also happen to industry. For instance, during the late teens it was discovered there was a big profit to be earned from the sale of dried figs. There were not many fig orchards and the tonnage produced was small. This company decided that since there was a big profit to be made in figs they would plant 12,000 acres, which they did. After the figs came into bearing the supply became very large in proportion to the former supply and the price was depressed so that there was a failure. So an industry before expanding must determine whether or not there is a possibility of expanding the market or, if markets are expanding, will they continue to expand. There must also be some thoughts given to the price and profit situation. Is the profit so great under the price at which the product is now being sold that other companies will be attracted to the same industry and the number of plants built become so great that the market is oversupplied?

One more important consideration has to do with construction costs at the present time. All of you are familiar with the fact that it costs twice to three times as much to construct a plant or a new machine as it did before the war. While prices are high, such a plant can compete and make money, but under real competition it is usually found that the plants in which the investment is not so great have an advantage. This, of course, is not true where new facilities include more efficient methods and where the operating cost is enough less than that of the older plant to offset the cost of the difference in investment. However, even such plants will be at a disadvantage competitively with others built, say two or three years later when the cost of construction is less.

I just finished reading a book on investment analysis and the author advised the reader to beware of making an investment in the common stock of a company that has constructed a new plant during a period of high construction costs. He said that before such an investment is sound such a plant must earn the first year enough to amortize the difference between normal construction costs and the actual costs. His observation was that many new plants built during periods of excess earnings and high construction costs are closed after a year or two of boom times.

It is best to build when costs are low; however, when costs are low, markets are not too good and many times there is no incentive to build a new plant. We all know, of course, that there are many industries that are growing even in periods of recession or depression. Anybody can reach the right decision in that case. The answer, of course, is to expand. Another difficulty about expanding during depression is the tightness of money.

So much for expansion. Let's consider why particular machines, equipment or facilities are added to a plant. A service industry has to think of the job done for its customers. It can't afford not to have the best machines available to do the best job. In a cold storage plant the goods have to be handled carefully. The refrigeration

must be applied exactly as required. The humidity must be satisfactory. It costs money to have all the machines that will produce the proper results, but they are necessary regardless of the cost or efficiency in many cases. In a manufacturing plant there must be machines that will put out the best product in the industry. Sometimes an extra process is required to get the excellence of product necessary to maintain leadership. Right now the ice industry is installing an ionization process which costs a lot of money in order to produce clear ice for retail trade in areas where it is difficult to get clear ice by older methods.

Every management must think of safety. Safety devices cost money. People must work under safe conditions; therefore, investments in safety devices are necessary. From the monetary standpoint I believe in the long run they are profitable. Accidents cost money and insurance rates go up as they occur. A man working in fear can't do his best job, which affects efficiency.

I believe it is also important to invest in machines that reduce physical labor so that the worker does not go home more tired than necessary. However, before buying such a machine it is also necessary to consider the cost. If the machine will improve efficiency enough to offset the additional cost, it should be added.

Analysis of Improvements

I next want to take up the points to consider from a profit standpoint before an investment is made in a specific machine. Let's take the case of a machine costing $20,000. What profit must this machine produce over the above present methods to be worthwhile? I would say that the profit should be at least 10 percent of the value of the machine per annum. Under present conditions on the money market this is low, but I say 10 percent because from this profit must be deducted income taxes amounting to about 4.2 percent, leaving a net for the investors of only 5.8 percent. If any of you think 5.8 percent is high, my suggestion is that you take your money and put it in the stocks of certain of the leading companies whose stocks are now selling on a basis returning actual dividends amounting to 6½ to over 8 percent and whose actual earnings are up to 15 percent of the amount you will have to invest to buy these stocks. For instance, here are the earnings of several well-known companies:

International Harvester	7.1%
General Electric	7.6%
Otis Elevator	6.5%
Ingersoll-Rand	6.5%
Underwood	9.5%
Standard Oil of California (plus a generous stock dividend)	6.6%
Kress Company	8.5%
International Shoe	7.2%
Texas Gulf Sulphur	7.9%
P. G. & E.	6.5%

The youngest of these companies was founded in 1921 and they have all paid dividends ever since. I checked the stocks of two ice companies and found that the American Ice Company paid 10.4 percent last year and the City Ice and Fuel Company 8.8 percent. In other words, investors are hesitating to place their money in stocks of our leading industries unless they can buy these stocks at a basis that will return them the above quoted percentages.

There are several reasons why stocks are quoted at low prices, yielding high rates of return, some of which are the following. The investors figure that profits have been inflated. Many new plants have been built at inflated costs, which are going to react against the companies at a later date. Inventories are large and at inflated costs. If prices are suddenly reduced large losses will be taken in such inventories. The investment of capital in an industry entails a large risk in the value of the investment. For instance, if you buy a share of stock at $30.00 and it later drops only $2.50 and you find it necessary to sell it, you have lost the entire 8 percent dividend that you hoped to make in one year.

Equipment Investment

When a piece of equipment is purchased it is not charged directly to expense. It is set up as an asset and written off to expense over its useful life. There are other burdens entailed in the owning of a new piece of equipment, such as: taxes, insurance and maintenance expenses. Now, if the useful life of a piece of equipment is estimated at 10 years, the burden of owning the equipment will be as follows:

Depreciation	10%
Taxes	3%
Insurance	1%
Maintenance—about	2%
Total	16%

To this must be added the profit of 10 percent mentioned above, making a total of 26 percent. Now, on a $20,000 investment in a piece of equipment, the savings or the earnings must be at least $5,200 per year to interest management. Under present conditions it might be that most managements would require a better showing than that.

Some of you might be interested to know what is taken into consideration by those companies engaged in research. Research has as its object the ultimate increase of profits through the development of new, more efficient equipment or processes or through the development of new or better products. The really enlightened and leading companies in the country spend an average of about 2 percent of all of their gross sales on research. I recently heard a talk given by Mr. Olsen, the president of the Western Cartridge Company, in which he revealed the formula employed by conservative management in evaluating new processes or techniques. The formula is $\frac{P \times S}{C} = 3/1$. In other words, the profit times the probability of success divided by the cost must be three to one. So if we have a new process that costs $100,000 to develop, the estimated profit is $300,000 and the probability of success is only .5, the answer is only 1½ to 1. Before such a product or technique or piece of equipment should be worthy of investment the cost must be either reduced by 50 percent or the profit must be increased 100 percent or the probability of success must be increased by 100 percent. This is a very severe formula, but management must not take any undue risks or the company will be in trouble and the people working for it will be out of a job.

Mr. Olsen also pointed out the relationship between the cost of research, the cost of a pilot plant to develop the results of the research, and the ultimate factory as follows: If research costs $1.00, the pilot plant will cost $10.00 and the factory $100.00.

To sum up, I think it is apparent that our present high standard of living has been the result of the increased investment in machines and methods resulting in the increased efficiency of labor. Even in the case of the investment in a specific machine this question of the total amount of the burden of the investment compared to the efficiency in labor to be derived from it must be considered. There is no use in adopting a new machine or new piece of equipment unless a study has been made to determine whether or not more can be produced for the same cost in labor or power.

For All Refrigerating Engineers—

The Purdue Convention, November 8, 9, 10, 11

THE program of the 40th Annual NAPRE Convention has been planned specifically to give engineers in all types of refrigerating plants the information they want for best operation of the equipment. A member of the NAPRE for more than 25 years, Professor Venemann has always been an active worker in its educational program. With his knowledge of the interests and needs of the plant engineer he has arranged a number of convention papers by members of the Purdue Faculty. Their treatments of the subjects will be clear and to the point.

The information these speakers give the convention will be equally applicable to plants utilizing refrigeration in cold storage, ice plant, dairy, brewery, processing, air conditioning and other work. For instance the Lecture-Demonstration on Chemistry will deal with scale and corrosion problems, water treatment and other phases of the subject which are particular concerns of all engineers charged with the responsibility of getting the most out of refrigerating systems at the lowest operating cost. The other subjects such as Welding, Plant Tools, Instruments, and Electrical Equipment are all equally universal in their application to all phases of refrigeration. Furthermore the papers will feature simple and understandable presentations of directly useful information.

A number of speakers from the industry generally will cover additional subjects of wide interest. Much of the information they will present is the type that comes from experience and practical analysis and is not found in textbooks or other general publications. Added to this will be the popular and valuable Bureau of Refrigeration Information from which the engineers are accustomed to obtaining the answers to their specific plant problems.

The list of speakers and their subjects is as follows:

"A Program of Education for the Operating Engineer," By Professor H. G. Venemann, Purdue University.

"Chemistry for the Refrigerating Engineer," By Professor Walter Edgell, Purdue University.

"Accident Prevention is Practical and Profitable," By J. P. Ferron, San Francisco.

"Uses and Limitations of Plant Instruments," By Professor William T. Miller, Purdue University.

"Fundamentals of Good Welding," By Professor P. W. Case, Purdue University.

"Details that Increase the Efficiency and Reliability of Refrigerating Plants," By Eugene Rytlewski, Chicago.

"How Refrigeration Plant Modernization Paid Off," By James Oldani, Springfield, Ill.

"Checking and Care of Electrical Equipment," By Professor R. B. Marshall, Purdue University.

"Plant Tools and their Uses," By Professor O. D. Lascoe, Purdue University.

"Practical Aspects of Food Freezing and Handling," By A. R. Carlson, Chicago.

"Refrigeration for the Ice Cream Industry," By Carney Nickerson, Indianapolis.

"Air Conditioning for Human Comfort," By Professor William T. Miller, Purdue University.

Bureau of Refrigeration Information, Regis Gubser, Head, with a group of experts.

There will be several Laboratory Demonstrations to show and explain exact procedures in plant operation and maintenance.

Those who wish to profit from this excellent program are invited to attend the convention. It is not confined to association members. For room reservations write or wire NAPRE, 435 No. Waller Ave., Chicago 44.

N.A.P.R.E. Question Box

NOTE: H. G. Venemann, Chairman of the Educational Committee, has agreed to answer through this column all questions asked by members of the N.A.P.R.E. Please send your questions to him care of Purdue University, West Lafayette, Ind.

Cooling Water Treatment

Question No. 826: When applying liquid chlorine to cooling tower water for control of algae and other growths, what concentration should be used in order to be effective and yet avoid attack on the metal of the system?—S.J.C.

ANSWER: The amount of liquid chlorine required for algae control in cooling tower water varies with a number of factors.

It varies directly with amount of sunlight, with temperature and humidity of the air, and indirectly with the water movement. It varies also with the type of make-up water used—lake or river water requiring more chlorine as a rule than well water, and with the quantity of make-up water.

All algae is dead when the circulating water shows a slight residual or trace of chlorine. Therefore chlorine should be added until a slight residual is shown by a comparator test. At the Purdue power plant a Hellige comparator is used. This is a simple instrument about the size of a small kodak in which the color of a sample of the chlorinated condenser water is compared with that of a sample of water free from algae. A dial on the instrument shows the parts per million of chlorine remaining in the condenser water. This instrument was obtained from Wallace & Tiernan Corporation of Newark, New Jersey.—H.G.V.

ANSWER No. 2: When applying chlorine to cooling tower water for control of algae and other growths, one-half to one ppm is generally effective when continuous treatment is used. Under some conditions using residuals of 5 ppm on a slug treatment basis are necessary for effective results.

There is evidence indicating corrosion would take place in these higher residuals but when slug treatment is used and the residuals are not present for more than an hour, severe corrosion is not likely to take place.

The question of what chlorine residual is effective varies considerably with the type of organic growth present and the conditions under which it is growing. Some bacteria growth can sustain life in concentrations as high as 50 ppm of chlorine, but this type would ordinarily not give trouble in a cooling tower.—Robert Savage.

Insulation Application Method

Question No. 827: In the application of a 6 inch thickness of insulation to the walls of a freezer storage, which of the following methods is better: (1) apply in three layers, each 2 in. thick; (2) apply in two layers, each 3 in. thick; (3) apply in one layer, using 6 in. slabs of insulation?—L.M.S.

ANSWER: It is my opinion that a 6 inch thickness of insulation should be applied in two layers each 3 inches thick

in preference to three layers each 2 inch thick, or to one layer of 6 inch thickness.

I would not give the last application any serious consideration at all, because of the probable gaps or spaces at the corners and edges of the cork board due to breakage and misfits. These defects would permit the free flow of heat from outside to inside.

These defects would be almost completely overcome by using two layers of 3 inch material if the joints were properly staggered, and even more thoroughly overcome by using three layers of 2 inch material.

I prefer the two layers of 3 inch material over the three layers each 2 inches for the following reasons:

(1) The overall heat transfer coefficient is practically as good.
(2) The cost of the cork board is usually a little less.
(3) The cost of labor for erecting is less.
(4) The cost of materials for bonding is less.
(5) The three inch cork board does not break in handling as easily as the two inch.

It is recomended by our old friend Edwin J. Ward of the United Cork Co., Chicago, that two or more layers of insulation should be erected with not less than ⅛ inch of troweled-on asphalt mastic between each layer which will produce a vapor barrier and prevent separation of the two layers of cork. He discourages the use of hot insulating asphalt for the following reasons:

"As we all know hot asphalt is merely a petroleum residue and the oils contained therein have a very short life. In fact, the major portion of them are evaporated during the heat process and thereby leaving mostly carbon residue. Moreover, it is almost impossible to obtain more than 30 to 40 per cent adhesion due to the irregularity of the surface of the first layer, and it makes an excellent void to entrap the migrant water vapor at the dew point temperature which occurs in all insulation, if the exterior wall is not thoroughly vapor sealed. Again there is the human element in handling, as we all realize that once a mechanic is burned with hot asphalt, he is either going to wipe off the major portion at the dipping kettle or wait for it to congeal before putting it in place, hence there can be no adhesion."—H.G.V.

Heat from Electric Equipment

Question No. 828: In the course of our instruction period in the Rio Grande Valley Chapter we were working on a hypothetical problem to calculate the total heat-load of a given storage room which contained a variety of commodities, a number of lights which burned continuously and two motors which operated part of the time.

The question arose as to how much of the power-input of the motors eventually changed into heat-energy within the vault. It was generally conceded in the case of the motor driving a fan that all the power output of the motor plus the motor losses finally showed up as heat which the refrigerating equipment would have to take up. But in the case of the motor driving a conveyor there was a considerable difference of opinion as to the proper portion to include as added heat-load.

It was argued by some that if the conveyor operated in a horizontal plane, then all the power input showed up as heat in the various bearings and sliding chain-links. But that if the conveyor raised the commodities to a higher level, as in the case of an ice-stacker conveyor, then it imparted potential or static energy in the raising of the weight and that this potential energy did not necessarily change to heat in the subsequent lowering of the weight unless a brake was involved in that lowering process within the vault.

We should greatly appreciate an authoritative statement from you on this discussion both from a practical and a theoretical viewpoint. It may be straining at details to try to predict the amount of heat involved and for practical purposes a rough estimate or assumption of total motor input might be safe enough, but our chapter has instructed me to get from you the proper procedure from both the practical and theoretical angles.—A.F.D.

ANSWER: If the motor is located within the storage room all of the electrical energy which enters the room through the wires is utilized in (1) shaft work and (2) in overcoming motor and control losses. This energy will eventually be removed as heat energy if a state of equilibrium is maintained.

In the case of the horizontal conveyor, the shaft work is small, being that required to move the commodities through a certain distance, plus that required to overcome the friction of the conveyor mechanism.

In the case of the vertical conveyor, the shaft work is increased by an amount required to raise x pounds of the commodity a distance of y feet above the original level. This is the potential energy which is stored in the commodity.

It is interesting to observe how this stored energy is eventually dissipated as heat energy upon lowering the commodity to the original level.

Of course it may be lowered slowly or it may be shoved off and allowed to drop. If lowered slowly as for example with a windlass, work energy must be applied to a crank or friction applied to a brake drum. Either action will be converted into heat energy. If shoved off and allowed to drop, the potential energy stored in the commodity will be converted into kinetic energy due to its acceleration. When the commodity hits bottom and its velocity is reduced to zero, the kinetic energy is again transformed into internal potential energy which causes the temperature of the commodity to rise or its molecular structure to change phase, necessitating heat removal to restore it to its original condition.—H.G.V.

New Questions

Condensers in Parallel

Question No. 829: To increase condenser capacity in our plant, three stands, (12 pipe high and 18 ft. long), of double pipe condensers were added to a shell and tube condenser. The double pipe condensers were mounted so that the bottom pipes are level with the bottom of the shell and tube condenser, and both condensers have liquid receivers with qualizer lines between them. The only way these condensers will work together is by throttling the inlet gas to the shell and tube condenser. If the inlet gas valve is wide open the condenser pressure will rise to 195 pounds but by throttling the pressure will drop to 165 pounds and stay there. How can we correct this installation, and why do the condensers act as stated above?—W.N.T.

Protection of Agitator Motors

Question No. 830: In our climate we have a problem of keeping the motors in brine agitators or circulators dry. When the tank is frozen down and the agitator is shut down for long periods, condensation forms on the cold agitator and motor parts. This wets windings and soaks slot insulation and tends to cause electrical break-downs when the motor is again placed in operation. How can we avoid these troubles?—R.V.C.

Bad Effects of Weak Brine

Question No. 831: What are the bad effects of allowing the brine to become weak in brine cooling tanks and brine circulating systems? I know that weak brine in a shell and tube cooler may freeze and split the tubes but what are the bad effects of weak brine where coils of various types are utilized for chilling the brine?—L.M.T.

Membership Contest Results

THE 1949 Membership Contest was rapidly reaching its close as this issue went to press. The shouts of confidence were more clearly heard from the southern section of the west coast. They have been working hard for a long time, which makes it probable that their present lead will again win for them.

Member Activities

Memphis

By Charles Conley

AT A SPECIAL meeting called on Tuesday, September 13, the chapter enjoyed an unusual treat in the visit and address given by Dean W. R. Woolrich, College of Engineering, University of Texas. Some years ago when Dean Woolrich was at the University of Tennessee he had charge of the educational program for Memphis Chapter and his many friends in Memphis always enjoy his visits. Mrs. Woolrich accompanied the dean and a dinner preceded the meeting.

In his address Dean Woolrich described many interesting phases of British life, customs and engineering developments he had observed during his year as Senior Scientist with the Embassy of the United States in London. He declared that British engineers keep themselves much better informed on international developments in their line of work than is true of the average American engineer because the former is more largely concerned with international trade while American industry produces primarily for domestic markets. British steam generating equipment was described and it was pointed out that designs are influenced to some extent by limitations of space.

The developments in connection with heating and air conditioning were detailed by Dean Woolrich. For the most part British people prefer fire-places for home heating. The mild climate in England has greatly retarded wide application of air conditioning. Most systems are justified on the basis of maintaining stores and their merchandise in cleaner condition.

On September 21 the Phoenix Rubber Co., in cooperation with Memphis Chapter put on an outstanding party at the Chisca Hotel. There were about 300 present and the Phoenix Co. entertained them royally with the excellent food the Chisca produces and with plenty of refreshments and entertainment. A large number of prizes were given to those present and everyone enjoyed a memorable evening.

The special speakers at the October 5 meeting were William F. Slater, W. F. Slater Engineering Co., and E. C. Decker, sales engineer, Carrier Corp., of St. Louis. The speakers first analyzed the different refrigerants used in air conditioning and industrial refrigeration equipment and told why the different refrigerants were selected for specific applications. Furthermore they explained how the selection of a particular refrigerant affects the size of the machine and details of the system.

The matter of proper procedure for shutting down air conditioning plants during the off season was described and many suggestions for keeping the equipment in good condition were given. Examples were given of the abuse of various types of equipment through lack of knowledge of the people owning and operating it This is true especially of air conditioning plants and those that are supposed to be fully automatic. The speakers said they were fully in accord with the city and national regulations on the installation and operation of such plants.

M. E. Hilliard, chief engineer of the Campbell Clinic was elected to membership.

San Francisco

By Hunter McLaughlin

Our meeting on the night of September 14 had as its educational feature a discussion conducted by our own member, Walter Sandholt of the York Corp., and chairman of our Educational Committee. Mr. Sandholt's topic covered the proper procedure to follow when starting up a new refrigeration machine and the subsequent care to be exercised thereafter. In spite of the fact that such a subject would be of very definite value to all of us, just on its own merits, Mr. Sandholt presented it in a rather unique way.

He started off by reading a suggested method of starting up a new plant, which he had "doctored up" with some intentionally hidden improper procedures. He then called on the audience to criticize each point. As well can be imagined, this led to a lively discussion by every plant engineer present. By the time that everyone had had their full say, the original list would never be recognized. Mr. Sandholt's wide experience was evident in the manner of his direction of the program.

Our meeting of September 28 was favored with the presence of Edward Simons, consulting engineer and vice president of the A.S.R.E. Mr. Simons spoke on the "Fundamentals of Heat Transfer in Tube Banks and Finned Pipes". He confined himself to discussing heat flow from the ambient air, through the tube material and on into the refrigerant. An explanation of the pertinent factors involved in arranging tube banks as well as the relative work done by each row of tubes was considered.

Mr. Simons pointed out that the natural increase in outside area available due to a decision to select finned pipe for the evaporating surface in lieu of plain pipe of the same nominal size, usually leads to a supposition that equivalent shorter lengths of finned pipe may be used to take care of a load in place of longer lengths of bare pipe. He explained that this leads to faulty design as actually only the outside area is increased by the addition of fins to the pipe and shortening the length also decreases the inside area. Considerations that tend to modify the full effect of this difference in surface area were also discussed. Mr. Simons presented his topic in his usual interesting and adroit manner.

New Orleans

By Frank Gillio

Our meeting of September 14 was held in the Jackson Room of the St. Charles Hotel. President Ford called the meeting to order promptly at 8 p. m. and after disposing of the regular business, turned the meeting over to the Educational Chairman. No speaker was present for this meeting because Mr. Vivien had three films on interesting subjects which were shown and were well received by the attendants.

At the next meeting held on Wednesday, September 28, St. Charles Hotel, Ray Polly of the Ansul Chemical Co. was the guest speaker. He gave a very enlightening, interesting and educational discussion on solids in refrigerating systems. Slides relating to the subject were to be shown, but due to the projection machine developing trouble, he was unable to do so.

The Quarter Club which is a pleasure unit made up of members of the chapter held their regular quarterly get-to-gether at Laurence's Restaurant on September 20 to partake of delicious sea foods, cold cuts, beer and soft drinks. The following members were present:

Ernest Amann; Carl Brindell; Frank Chase; James Chaisson; Harold Doss; Raymond Frishhertz; Edwin Ford; D. Fischer; George Gaspard; Johnny Goutreaux; Frank Gillio; Hilton Hardy; C. Herberger; Harry Kelley; E. Leclere; C. Maier, Bartholomew Mancuso; Thomas O'Connor; Julius Prager; Wallace Schwab; Joseph Vernac; Chester Watson.

Our Sergeant-at-Arms, Jimmy Chaisson donated and prepared fifteen dozen of the best crabs we had the pleasure of devouring in a long time. Thanks Jimmy!

The members were treated to a surprise when our genial friend Julius Prager informed the happy crowd that since they had finished eating and drinking beer, they could now sit back and relax and enjoy a more invigorating drink. Julius donated ten bottles of sparkling champagne. Every one had a good time.

Pittsburgh

By Louis Mantz

On September 21 the chapter held a plant inspection trip to the Iron City Brewery, a plant of the Pittsburgh Brewing Co. First the engineers watched the two new 200 ton Frick ammonia compressors which were recently installed. P. A. Willis, Pittsburgh representative of the company explained to the group the design and operating features of the machines.

Then a tour was made of the boiler room to see the two new Babcock and Wilcox boilers. The equipment and its operation were described and explained by the assistant chief engineer of the plant. After the inspection tour was completed the group proceeded to the lunchroom where Messrs. Knoch and Tessmer had prepared a very fine lunch which was donated by Mr. Willis.

An unanimous vote of thanks was extended to Mr. Willis and to Mr. Larson, master brewer, for a most enjoyable and interesting evening. Seventy-five members and friends of the chapter were in attendance at this meeting. We were pleased to have George Pownall, member-at-large from Cincinnati present at the affair.

N.A.P.R.E. Department

Detroit

By Leon Adams

Detroit Chapter began the fall season with an open house. The families, friends and prospective members were invited to enjoy this meeting and the special entertainment which had been arranged. The affair opened with dinner at Carl's Hall.

Two sound motion pictures produced by General Motors Corp., were shown: "The Price of Freedom" and "Frozen Freshness". The Melodeer Quartet presented a program of vocal entertainment. Then those in attendance concluded the evening with dancing.

Seattle

By James Henion

At the first fall meeting the chapter gathered in the Orkila Room of the YMCA for the usual dinner served at 6:30 p. m. In the business meeting which followed Wendell Wolfe was accepted for active membership in the chapter.

The first of a series of talks on the practical use of the Mollier diagram in the plant was presented by O. F. Gellert. The members of the chapter are showing a great amount of interest in the use of refrigerant diagrams.

Then Jack Pamment introduced Mr. Van Huyschen who exhibited and discussed the electric magnetic float control he has invented. His chief purpose in addressing the meeting was to determine if there is any particular application in the refrigeration field for a control of this type. After some discussion it was the general consensus that while the control is ideal for certain boiler applications it is not suitable for refrigeration. The new 1949 Operating Data Books were distributed to those present.

Chicago

By E. B. Jones

The new series of lectures on practical refrigeration engineering was begun at the first meeting of the fall season by Instructor Gene Rytlewski. It will feature the design and operation of automatic refrigerating plants. The first half of the season is being devoted to a moderate size plant using refrigeration in processing and storage. The second half of the series will cover an air conditioning plant of moderate size.

The course began with a discussion of the layout of the refrigerated plant, its load characteristics and the refrigeration demand. Then Mr. Rytlewski proceeded to a discussion of the condensers and how they should be connected into the system. He emphasized that where more than one condenser is utilized the discharge water temperature should be carefully checked to insure that both condensers are operating at the same water temperature. It was suggested that 10 sq. ft. of condenser surface is ample and that many plants are out of balance in this respect so that water velocity is too low. Two gpm. of water was given as an average figure. The sizing and arrangement of refrigerant receivers was then explained.

The special speaker at the first meeting was Dr. Tohru Inouye, University of Illinois, Chicago, who discussed "Air Conditioning and Its Effects on the Human Body." Dr. Inouye has conducted extensive research along this line in special laboratories set up for the purpose. Some studies have also been made on allergy in connection with air borne substances. He described the reaction of human subjects who were accustomed to closely controlled air conditions and then moved quickly to other rooms where the temperature and relative humidity is considerably different. The subjects showed certain shock effects as far as bodily temperature and other reactions are concerned, but apparently the body makes rather rapid adjustment to changing environment, unless the changes are considerably magnified.

A symposium on the air handling side of air conditioning systems brought most interesting discussion to the second meeting. The discussion leader was H. H. Van Epps, Tuttle & Bailey, Inc., who is especially talented in framing questions and drawing on his knowledge to bring out points of general interest. Associated with him in the symposium were:

R. B. Hudson, Air Products Equipment Co.
Wm. F. Puhr, Air Devices, Inc.
S. F. Rost, New York Blower Co.
Si Rottmayer, Samuel R. Lewis & Associates.

Early in the proceedings a questioner wanted to know why propeller type fans with their lower power consumption were not more widely used for controlled movement of air. The differences between propeller, axial flow and centrifugal fans were explained and it was pointed out that noise levels as well as system resistance fairly well determine the type of fans which should be used. Numerous problems in connection with air flow systems were thoroughly discussed. What could and could not be accomplished with different types of air outlets were explained. It was stated that commercial installations should have their ducts sized to give a velocity of 1,700 to 2,000 ft. per min. in main trunks while branch duct velocity should be 600 to 800 ft. per min. The chapter ecpecially appreciated the wealth of valuable information which the speakers provided and their excellent coordination in the discussion of the various phases of the subject.

Tacoma

By C. W. E. Johnson

Robert Slater of the Educational Committee gave an exceptionally good talk on power factor at our last meeting. He defined power factor and how it affects energy usage and capacity and told what engineers can do to raise the power factor in their plant, as well as avoid penalties imposed by the central station companies for low power factor.

Chairman Otto Stolz of the Educational Committee announced that a field trip to the Sperry Flour Mills had been arranged for the November meeting and invited everyone to make the trip. There was considerable discussion on the proposition as submitted in a letter from President Koehne in regard to increasing the initiation fee of new members. The opinion prevailed that any increase of the initiation fee would tend to make it hard to obtain new members, and a motion carried that the chapter would rather favor an increase in the yearly dues from $7.00 to $7.50 or more if necessary, to place the national organization in a better financial condition.

Colton

By H. O. Bonter

An interesting meeting was held at the Tri-City Climate Control Co., Chrysler Airtemp Dealers, Riverside, Calif. The host was Edmund Warner, one of our members. The guest speaker was Arthur Hess of the firm of Hess, Greiner and Polland, Los Angeles. Mr. Hess gave a very interesting talk on the air conditioning of green houses and growing of plants under conditions of artificial lighting and atmospheric control. In this way growth and production of the plants can be controlled to good advantage. Enjoyable refreshments were served at the conclusion of the meeting.

The following meeting was held at the Santa Fe Ice Plant in San Bernardino. The special speaker of the evening was J. N. Berger, sales engineer of the York Corp., and a member of our Los Angeles Chapter. Mr. Berger described the various types of refrigeration plants and told how proper design and operation control contribute to obtaining the best results from them. The usual lunch of doughnuts, coffee and pie was served to those in attendance.

Los Angeles

By Fred Herr

In an atmosphere akin to that of a baseball team watching the approach of the season's end with a comfortable ten game lead, Los Angeles Chapter of the NAPRE heard Membership Committee Chairman W. R. Burnett present a rousing report of the summer's activities at its September 21 meeting in the Terminal Club.

Burnett reported seven new members ready for admission that night, 33 enrolled at the Ham-and-Beans Dinner held earlier in September, making a total of 40 admitted during the month and a grand total of 108 for the 1949 campaign.

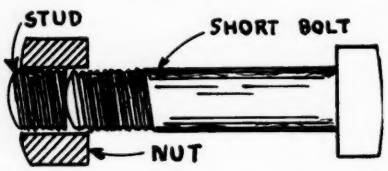
There seemed to be no audible disagreement with Burnett's conclusion that 108 new members should be amply sufficient to assure Los Angeles a third successive membership pennant and to withstand the onslought of any chapter that might have planned a last-minute drive.

(Continued on page 66)

ENGINE ROOM POINTERS –

A "Cover Up" Bolt Trick

READERS of this publication have doubtless had numerous experiences with bolts. But, have you ever seen a "cover up" bolt job as shown in the accompanying rough sketch? It is all right to know what constitutes a good bolt, but it is also well to know why structures sometimes fail—because of the possibility of a poor bolt like this. On many occasions this writer has been criticized because he insists on writing about failures as well as successes. He maintains that readers should know about "cover up" tricks, such as this one.



Workers will commonly "cover up" poor work, if possible, rather than do it over again. This sketch shows an example. The worker inserted a bolt that was too short. The nut would go only "part way," as shown. He didn't want to go to the trouble of removing the bolt and inserting a longer one, so, to cover it up and make it "look" like a good job he cut off a threaded piece which the writer has called a "stud" and inserted it, as indicated in the sketch. This particular job was of sufficient importance to require an inspector. The inspector came, went through his usual performance of tapping the finished job with his hammer, gave his official nod of approval, and passed along to his next inspection job. Had the inspector known about tricks like this he probably would have caught it.—F. S. W.

Then, No Good, Now, Very Good

A NUMBER of years ago this writer was connected with a prominent manufacturer who specialized in a single product. The writer was exceptionally proud of the company and the product, so while traveling around the country he talked about the product to many people. The product was praised by most if not all users, but competitors found fault. Competitors said that it was defective here and defective there and that it was about the poorest product of its type on the market. All of which, of course, had a tendency to disturb this enthusiast to a considerable degree.

However, as stated, that was "a number of years ago." The writer is no longer connected with the above manufacturer. The patents on the product have expired. And, what are the former competitors saying about the product now? Believe it or not, they are now making the same product themselves in competition with the writer's former employer. Are they criticizing it? They are NOT. They are unanimously saying that it is the best of its kind in every way.

The moral is: it is quite possible that competitors are sometimes biased in their expressions, hence in the selection of products it is often necessary for us to exercise our own best judgment.—S. W. F.

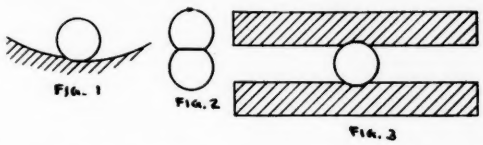
How to Avoid Belt Troubles on Flanged Pulleys

WHEN flanged pulleys are not properly aligned, the accompanying sketch shows what often happens or is likely to happen. The belt tries to climb one of the flanges, and as a result the climbing edge of the belt becomes worn and frayed, or it stretches. Sometimes the belt actually succeeds in climbing the flange and jumping off the pulley.

This "climbing action" is commonly caused by belt dressing or dirt accumulating on the pulley. The accumlation "piles up" until it is higher than the pulley crown, and since a belt always moves over to the higher side it is thereby pulled over against the flange. To avoid such behavior be sure that the pulley is amply wide so that the edges of the belt do not touch the flanges when alignment is correct. Then maintain true alignment, and keep the surfaces of the pulley face and belt clean—F.S.W.

Why Do Anti-Friction Bearings Require Lubrication?

EVERY reader has doubtless been told from time to time that ball bearings and roller bearings really don't need oil for reducing friction. We are told that "the lubricant in an anti-friction bearing performs a function that is different from the function it performs on plain bearings." It is claimed that "the purpose of a lubricant in a ball bearing is merely to preserve the highly polished surfaces of the balls and races." It is said that "the balls and races are always in point contact."



But that is not true. To begin with, there is no point contact; it is surface contact. When a hard steel ball is pressed against a race it is slightly flattened and "sinks into" the race, as shown in Fig. 1. When two balls are pressed against each other, as in Fig. 2, the contact surface is perfectly flat. So now, obviously, when either of these balls, Figs. 1 or 2, is "rolled," there is bound to be some friction, the latter being unavoidable. This is best illustrated by taking two pieces of flat rubber, Fig. 2, pressing them together with a ball between, and rolling the top one on the other, as indicated. Whether the ball is of steel or rubber, the frictional resistance will be found to be considerable. With a rubber ball the friction will, of course, be greater. But it is now evident that, in a way, lubricating oil performs the same function in a ball or roller bearing as in a plain bearing, although not to so great an extent. You can see, too, why it is so important to use strong and hard steel in anti-friction bearings.

What Is Most Important?

YOU may have an answer of your own to the above question, but this writer's answer is "Life", which in turn doubtless explains why most if not all people are in favor of "Safety First".

In this intensely mechanical age safety is becoming more and more important every day. All worth while people, industries, and institutions are out and out advocates of "Safety First".

If you have ever done any designing you certainly apply the question, "Is it safe?" before putting your final OK on the design of any mechanical device, do you not? If you are a manufacturer you certainly ask the same question before beginning the making of anything mechanical. And if you are a user of any mechanical device you surely insist that unless it is safe you will not use it. At least, you should.

Wherever security of human life is involved the most important question always has been and the writer dares say always will be—"Is it safe?" Thus, paradoxical as it may seem, manufacturers of cannon and other instruments of warfare designed for the destruction of human life take great care in making those instruments as safe as possible for the perpetrators of the destruction. They strive in every way to make those machines unsafe for the "other fellow" but safe for us.

Consider, for instance, an ordinary unimportant-looking nut. It will become obvious to anyone, upon giving it thought, that the very smallest nut used on passenger carrying equipment is not a safe nut if it will not function properly—if it will come off. A passenger carrier cannot be safe if its parts are unsafe. Whether or not a nut is safe depends entirely upon the thoroughness and conscientiousness of those who put the nut in place. An absolutely sure method must be used to keep that nut in its proper position.

Even where human life may not enter at all, as on machines used in the manufacturing industries, loose nuts are undesirable and often expensive. Loose nuts are not safe from an investment standpoint. It pays to keep nuts where they belong. It is highly desirable to see that machine parts stay put.

As a result numerous methods have been developed for holding nuts in place—cotter pins, double nuts, washers that "catch" the nut, etc.—most of which are effective. But, a walk along any railway road bed, or on any automobile highway, today, reveals the fact that nuts still do come off. We have not yet attained 100 per cent efficiency in the simple art of keeping nuts in place.

And so on. There are many other unimportant-looking things that must be watched in order to make living safe. To cover all of them would require a huge book. Nuts, though, are particularly important.—S.W.F.

Sanitation in the "Old Days"

WHILE out in the mid-west not long ago conversing with a woman who has resided in one of the prominent dairy states for many years, the talk drifted over to dairy sanitation, and the writer was startled to hear the following choice bit which the lady declared was an actual occurrence:

"Yes, back in the old days things were much more slip shod than they are today. I remember one time at the creamery they found a rat in the cream that had been purchased from a neighboring woman. When the woman was informed that the rat had been found she said, 'What? Didn't I get 'em all out?' "—W. F. S.

Men Live Longer Than the Years They Work

FEW people are aware of the true shortness of life. This applies particularly to people who are still young or who consider themselves young. This writer was startled when he looked at it in the following way, which, surely, is a perfectly fair way of looking at it:

Up to the age of eighteen it is excusable to be a "loafer," or to take life fairly easy. Child labor laws are applicable to that age. We are inexperienced, our time has little money value, and we grow rapidly.

At the age of seventy it is regarded as a privilege to retire, if we can or if we wish to, so that loafing is excusable after that age. In fact sixty five is becoming a common age at which to retire, but let us say seventy for good measure.

This gives us (70 - 18) 52 years of life during which we should spend at least eight hours seriously out of every working day. Eight hours are allotted to sleep and the other eight hours to dressing, walking or riding to and from work, eating, and recreation.

It is also considered excusable not to work during Sundays and holidays, and Saturday is becoming very much of an "off day" making our active life still further curtailed.

On a basis of eight hours per day and five days per week we have the much-talked-about "40-hour-week." Allowing two weeks for vacation we have 50 active weeks which, multiplied by 40, gives us 2000 hours per year. From this must be deducted 96 hours for 12 holidays which most of us take, namely—New Year's, Lincoln's Birthday, Washington's Birthday, Good Friday, Memorial Day, July 4th, Labor Day, Columbus Day, Election Day, Armistice Day, Thanksgiving Day, and Christmas, leaving 1904 hours per year. We will be generous by not deducting time for sickness or "off-days" taken by many of us.

Multiplying 1904 by the 52 active years we get only 99,008 hours as our lifetime work hours.

In hours, this may sound like a great deal, but, divide it by 24 and one finds that it is equivalent to 4,125 days, which divided by 365 shows that it is only 11.3 years. In other words, we work only 11.3 continuous years and are then satisfied to call it a "well rounded out life."

Let us take a child 12 years old who will be trained to work 40 hours per week and who will observe all the holidays and other trimmings. He has already lived longer, much before he begins to even think of serious work, than he'll work during his whole lifetime after getting started.

Life is indeed short. It is unnecessary to ask a person who has lived through 70 years. These figures prove it. It is impossible to place too great a valuation on one's time. They also demonstrate the importance of preventing accidents and the loss of time through injuries.

How Accurate Are Electric Clocks?

ASK almost anybody the above question, including engineers, and the chances are you will be told that electric clocks are "absolutely correct." There was a time when this writer, too, believed that electric clocks are accurate. But this is not necessarily true. Their accuracy is dependent entirely on the accuracy of the governor that controls the turbine, engine, or other motive power that drives the electric generator at the power plant.

Recently the electric clocks in one city were so fast during Sunday night that alarms went off "twenty minutes to half an hour early" on the following Monday morning. The power plant manager explained that the cause of this unusual trouble originated in the turbine governor.—S. F .W.

Frozen Foods
Reg. U. S. Patent Office
COVERING EVERY PHASE OF THE QUICK FREEZING OF PERISHABLE FOODS—PREPARATION, PACKAGING, FREEZING, STORAGE, DISTRIBUTION, DESIGN, CONSTRUCTION, EQUIPMENT, OPERATION OF LOCKER PLANTS.

Frozen Food Locker Institute Holds Exposition and Convention

A DISPLAY of modern equipment, machinery and supplies; presentation of an advertising and publicity program; and conferences on activities and side lines of the locker business provided the basis for the exposition and convention of the Frozen Food Locker Institute held at the Sherman Hotel, Chicago, Ill., October 3-6, 1949. While the membership of the Locker Institute is composed largely of manufacturers, suppliers and contractors, during the past year locker operators have been invited to join the Institute and a considerable number of them were present at the convention.

One of the interesting features was an address by the Hon. Kenneth S. Wherry, U. S. Senator from Nebraska and Republican Floor leader of the Senate. Sen. Wherry pointed out that the frozen food locker industry is essentially American in its origin and methods of operation because it has been developed entirely by private enterprise with no government help and no government subsidy, but he warned that this industry as well as others is in danger of being hampered by the encroachment of government regulation.

The control of surplus farm products has a direct bearing on the locker business, he said, and this control carries with it a danger of interfering with natural economic processes. Improvements in facilities for storage of farm products, which is one of the services provided by the locker industry, he said, will do more for agriculture than all the government controls that could ever be devised, and furnishing such storage facilities would be in line with sound economic and business principles. The vast expenditures of money by the government cannot go on forever and it is particularly dangerous when such expenditures favor one class of citizens as against others. Deficit spending, advocated by some in high government places is a most treacherous and dangerous doctrine, he said.

Advertising and Publicity Program

An advertising and publicity program was presented by representatives of Baumont Hohman of Chicago. The locker industry, it was pointed out, has had a vast growth because it met definite needs, but now it is coming into a leveling off period which requires promotion to sell the service to new customers which the industry must have for continued expansion. A comparison was made with the advertising and publicity program of the National Association of Ice Industries which has enabled ice distributors to maintain their volume of ice sales in spite of the tremendous competition and inroads made in the consumption of ice by household mechanical refrigerator.

New Officers and Directors
Frozen Food Locker Institute

President, S. A. Scobell, De Witt, N. Y.
Vice-president, E. E. Jackson, Kellogg, Iowa.
Treasurer, R. R. Farquhar, Omaha, Nebr.
Directors: Guy Dean, Owensboro, Ky.; Archie Liman, London, Ont., Canada; Ralph Hood, Guthrie, Okla.; Howard Uller, South Bend, Ind.; Stanley Smith, Tulari, Calif.; Bryce Vollmar, Sioux City, Iowa; Perry Phillips, Columbia, Mo.; Carl Franzen, Menasha, Wis.; C. W. Friese, Chicago, Ill.

It was further pointed out that there had been many changes in the locker industry during the last few years. One is that newspapers, farm papers and general magazines no longer are interested in telling the story of locker service because it has become familiar to readers and is no longer a new story. Another advantage is that locker plants have facilities now to do a more complete job, providing a better service. Another is that home freezers have entered the picture making potential competition for the locker. Waiting lists have disappeared and some plants have vacant lockers.

All of these facts were built up to indicate the necessity of promotion, keeping people sold on what locker service is and what it offers. The average locker plant might be able to get along without advertising, but it could do a better business and make a better profit with advertising.

Perry Thomas, Chicago, representative of Baumont Hohman then described briefly the advertising materials that would be available to members of the Institute. This included, for local advertising, newspaper mats, radio programs, printed folders and slide films. For the National advertising program, magazine advertisements in women's magazines was recommended, playing up the economy and convenience of locker service and emphasizing that it provides better food. National advertising, Mr Thomas said, builds prestige and shows the importance of the product or industry. For an adequate program of locker advertising, he suggested that local newspaper advertising would provide the best opportunity, but it should be supplemented with magazine advertising.

Conferences

Practical aspects of the locker business were presented at morning conferences on merchandising, smoking and curing, packaging, meat cutting, and sausage and bologna. At these conferences, talks were given by a selected panel after which the subjects were discussed informally and questions from the audience were answered.

At the merchandising conferences the point was made that all customers appreciate good service which includes good wrapping and proper storage, so that products will be as good when they come out as when they went in. The city dweller with relatively high income, offers a new field of prospects for selling of frozen foods. Complete and adequate service is the foundation of good merchandising. Newspaper and other advertising mediums were discussed briefly and such advertising was recommended as an important part of any merchandising program.

At the smoking and curing conference, it was emphasized that sanitation is a very important point. One of the operators at this conference said they had found home slaughtering so unsatisfactory from this standpoint that they had adopted a policy of accepting carcasses only from slaughter houses in their community, but they prefer to do the slaughtering themselves. Another point was that pieces of meat do not take cures alike, which makes it difficult to get uniformity. In addition to hams, shoulders and bacon, particularly thought of as specially adaptable to curing and smoking, it was pointed out that other items that could be smoked or cured are smoked turkey and corned beef.

At the packaging conference, new methods of packaging and new packaging materials were discussed. Representatives of packaging material houses discussed the different types of materials available, explaining their differences and mentioning a number that are especially adaptable for frozen food and locker use. It was suggested that locker plants would find it of much advantage to use only the best of packaging and wrapping materials, thereby establishing a high standard of quality and using this feature as a part of their merchandising.

At the meat cutting conference a practical demonstration was presented on the cutting and trimming of various cuts of meat. In this demonstration, an electric meat cutter was used.

A sausage and bologna conference was conducted at which talks and discussions were given on making sausage and bologna and demonstrations were presented on grinding the meat and packing it ready for locker storage and use.

Miss Frozen Food Locker

One of the entertaining features of the convention program was crowning "Miss Frozen Food Locker of 1949." For this event two beauty contestants paraded before the convention audience, one representing the East and one the West, but the judges could not agree and then decided to cast an unanimous vote for an Aberdeen Angus heifer imported for the occasion from Iowa. The heifer, "Aphrodite" was then crowned with appropriate ceremony and numerous pictures were taken of her, surrounded by an admiring audience.

Developing America's Live Stock

An interesting talk on developing America's live stock was given by Jerry Sotola, district director Live Stock Bureau, Armour & Co., Chicago. Mr. Sotola said that frozen food lockers are important as a means of conserving surplus meats and providing a steady supply of foods from one season to another.

Speaking of trends in the live stock industry, he said that the supply of sheep and lambs is down to less than since the Civil war. Hogs are being marketed in weights of 200 to 220 lbs. because they produce more lean meat, but lambs are coming through heavier and this creates a marketing problem.

Packers, he said, are selling their product on the basis of nutrition and quality and as a result of this program, the meats sold in retail markets are better quality than ever before. And this trend toward better quality is due in large measure to the agricultural experiment stations which, through research, have shown stockmen how to produce better live stock economically. By-products are also important in the meat industry and here research has taken an important part in showing how to utilize them.

General Business Sessions

At the general business session held Tuesday morning, the secretary's report covering the activities of the Institute was reported by R. R. Farquhar. Mr. Farquhar announced that having served as secretary of the Institute since its organization, he felt that he had served his time and would not be a candidate for re-election. He expressed thanks to all who had worked for the good of the organization during the past six years. Their one thought he said had been to advance the interests of the frozen food locker industry and as a part of this work they had sent out a vast amount of information.

Speaking briefly on the rift between the two locker associations, he said, they all must realize that a divided industry cannot prosper, but he also felt that the program of the Locker Institute offered much of value to the locker industry. Criticizing those who held to the view that further expansion was undesirable, he pointed out that there are many areas in the United States where locker plants are needed and it is to the interest of the industry that this need be supplied with modern locker plant service.

In opening membership to locker plant operators, the Institute had made available a program of advertising and publicity which he believed would do as much for the locker industry as National Ice Advertising had done for the ice industry. During the last three months he said they had received membership applications from locker operators in 23 states and Canada. In this connection a change in by-laws was presented and adopted giving locker plant members equal representation on the board of directors with the suppliers, contractors and manufacturers.

Some locker plants, he said, had been over-expanded and some of them were too expensively built and this had an adverse effect on the entire industry. Only plants built to fit the community, based on sound information as to its possibilities, can succeed, he said.

Members of the board of directors for the coming year were elected. At the meeting of the newly elected board following the general business session, new officers were elected for the coming year as follows: For president, S. A. Scobell, De Witt, N. Y.; for vice-president, E. E. Jackson, Kellogg, Iowa; for treasurer, R. R. Farquhar, Omaha, Nebr. No announcement was made at that time as to selection of a secretary to succeed Mr. Farquhar.

New Locker Customers

At the final session an address on "Why 612,000 new customers rented lockers in twelve months" by John L. Hoppe, St. Louis, Mo. Mr. Hoppe recalled that just a year ago he had given a talk on a similar subject at the locker convention and at that time only 88 per cent of the lockers in the United States were rented one in every eight being empty.

A 1949 survey just completed shows that the average rental has gone up to 92 per cent. During the past year 648 new locker plants were constructed making a net gain of 400,000 lockers. According to this survey, the average locker plant in the United States today has four more locker renters than it had a year ago, bringing an average of $122 more revenue to each of the 10,948 plants, a new business gain of approximately $1,000,000,300. This is a large figure he said, but it is only a drop in the bucket compared to the increase in revenue per plant which was received through new and increased business, stimulated by the locker operator who has been doing a real selling job.

Although there are a few failures and unsuccessful plants in the locker industry, the proportion is quite low as compared to other industries. The locker business is growing and will continue to grow because it provides a service which the people want and need but to succeed, the locker plant will have to provide the kind of service the people want. The operator must realize that the most important person in the locker business is the locker customer; he must know his customers and know what they want.

One of the essential facts is that patrons rent lockers primarily to reduce the cost of living; a secondary factor is convenience and another factor is that lockers provide better food. It is upon these facts, he said that a successful merchandising program can be built. But it also indicates that to provide this service, the locker owner must have a plant well-equipped, with efficient help and be able to provide complete service.

Entertainment

An interesting program of entertainment was provided. Tuesday afternoon a play, "Mr. Smith Modernizes his Locker Plant" was presented showing the advantages of modernization. The second annual meeting of the Polar Bear Club and buffet supper was held Wednesday evening. While the men were at this party, a theater party was arranged for the ladies.

The ladies entertainment program included luncheons at the Hotel Sherman, theater parties, radio broadcast parties and a luncheon and fashion show at Marshall Field's.

Exhibits

An important part of the exposition were the exhibits of machinery, supplies and equipment, presented by the members of the Institute. These exhibits were shown in 47 booths on the mezzanine and in the adjoining Bal Tabarin exhibit hall.

Frozen Fruit Outlook Shows Increase

COMMERCIAL food freezers will have packed slightly more frozen fruits, fruit juices and berries by the end of the 1949 season than they did in 1948, according to an official estimate by the U. S. Department of Agriculture. The 1948 pack totaled 396 million pounds. The Department's Bureau of Agricultural Economics said frozen citrus juices will be packed in considerably larger quantity than in 1948, but packs of frozen strawberries and sour cherries will be moderately smaller. Increases are expected to more than offset decreases in the packs of less-important frozen items such as apricots, boysenberries, red raspberries and similar products. The Bureau indicated that consumption of frozen fruits and berries is expected to continue at a rate of about three pounds per person per year.

Frozen Food Locker Plants Now Total 11,245

A TOTAL of 11,245 locker plants in the 48 States was reported by the State Extension services as of July 1949. This is an increase of 628 over the eleventh annual count made in 1948. A more complete canvass in some states found some plants that had been overlooked previously, and a number of small units have been added during the year. Expansion in most of the Midwest and in Washington, California, and Texas was small, although Michigan, Minnesota, and Wisconsin showed a definite growth. A few states reported a small decrease in total number of plants. The following tabulation shows the increase in locker plants since 1938.

	1949	1948	1947	1946	1945	1944
Total plants	11245	10617	9529	8025	6484	5282
Yearly increase	628	1088	1504	1561	1182	723

	1943	1942	1941	1940	1939	1938
Total plants	4559	4323	3623	2870	1861	1269
Yearly increase	236	700	753	1009	592	

July 1949 count of locker plants by states was as follows:

	1949	1948		1949	1948
Alabama	82	82	Nebraska	504	470
Arizona	34	34	Nevada	13	13
Arkansas	114	112	New Hampshire	27	27
California	526	519	New Jersey	50	17
Colorado	223	230	New Mexico	40	45
Connecticut	59	60	New York	235	235
Delaware	11	12	North Carolina	107	100
Florida	58	34	North Dakota	300	272
Georgia	168	163	Ohio	355	330
Idaho	195	175	Oklahoma	340	317
Illinois	595	574	Oregon	340	355
Indiana	348	329	Pennsylvania	304	242
Iowa	859	841	Rhode Island	8	8
Kansas	510	480	South Carolina	73	71
Kentucky	118	92	South Dakota	299	299
Louisiana	45	46	Tennessee	131	125
Maine	18	13	Texas	535	514
Maryland	43	40	Utah	149	124
Massachusetts	44	29	Vermont	49	48
Michigan	375	320	Virginia	72	72
Minnesota	675	630	Washington	671	665
Mississippi	90	99	West Virginia	19	13
Missouri	472	460	Wisconsin	675	601
Montana	221	215	Wyoming	66	65

Frozen Foods Convention to Be Held in Chicago February 1950

PRELIMINARY plans have been outlined for the 1950 frozen foods convention to be held in Chicago starting next February 1. Chairman of the convention committee is William M. Walsh, president of National Wholesale Frozen Foods Distributors, Inc. His coordinating group has already held a series of meetings and has announced some preliminary decisions, according to officials of the National Association of Frozen Food Packers here.

The convention will officially come to order on February 1, 1950, but a pre-convention cocktail party will be held on January 31. Sessions will be held at the Congress hotel. The various participating association will hold their annual meetings on February 1. The following day, general sessions will take place, followed by a buffet supper in the evening. On February 3, special meetings will be scheduled. These will include panel discussions on industry problems, technical reports, and discussion of matters facing all branches of the trade.

All room reservations will be handled by a special housing committee with headquarters in the Congress Hotel in Chicago.

Frozen Foods

New Frozen Purees From Citrus Fruits

By E. A. Beavens

Research Laboratory Bureau of Agricultural and Industrial Chemistry, Pasadena, Calif.

FROZEN fruit and berry purees, for use in frozen desserts, baked goods, and other foods, have been in commercial production since 1937. Citrus fruits, however, have not been included in the long list of products frozen, largely because the opinion has prevailed that they are too strongly flavored and do not keep well in storage. Until recently it was generally believed that such products would develop a "terpeny" off-flavor because of the high oil content resulting from the use of whole fruit in the pureeing process. Several experimental packs of orange and lemon purees were put up by the Laboratory of Fruit and Vegetable Chemistry in Los Angeles, Calif., during the season of 1947, and after a year's storage at 0 F. it was concluded that frozen citrus purees did not develop unsatisfactory flavors if properly prepared. Commercial production of these purees was started shortly thereafter with immediate success.

Preparation, Packaging, and Freezing

The processing method developed for the preparation of frozen citrus purees is a comparatively simple but effective means of retaining color and flavor in the finished product. Sound, mature fruit is first thoroughly washed, preferably with a good detergent, and rinsed well with cold water so as to reduce microbial contamination to a minimum. Next, the stem end of the fruit is cut off and other discolored spots removed, so that no dark specks will be mixed in with the bright-colored puree. If Navel oranges are used, the "navel" end should first be cut off.

After the whole fruit has been trimmed, it can be either crushed through a machine, such as an apricot pitter, or quartered. The crushed or quartered fruit is then reduced to a puree by passage through a mechanically driven screening device with minimum incorporation of air into the product. Screen openings of 0.027 to 0.044 inch in diameter can be used, depending on how the puree is to be used. Screen sizes of 0.027 and 0.033 are preferable when purees are intended for sherbets, ices, pies, and beverages, while larger sizes are better for purees intended for marmalades, jams and cake or sundae toppings. The yield of puree from the whole fruit is approximately 50 to 60 per cent, and it should contain 0.65 to 0.75 per cent of peel oil. With some lots of fruit, the peel oil content of the puree may be considerably higher, and too strong for most purposes. In such cases, the oil content of the puree can be controlled if various proportions of the fresh fruit are passed through an abrasive machine to remove most of the oil sacs or flavedo.

After a puree of the required oil content is obtained, it is next run into a stainless-steel tank and dry sugar is gradually added with thorough mixing in the proportion of 5 parts of puree to 1 part sugar. The sweetened puree is then filled into tin containers of 1 to 2.5 gallons in capacity, hermetically sealed or closed with slip tops, and the contents are frozen in an air-blast freezer at sub-zero temperatures. The filled containers are stored at temperatures of 0 to -10 F. The puree can be frozen more rapidly if first it is run through some type of heat exchanger and filled into containers in the form of a frozen slush. The high-acid citrus purees are preferably packaged in lacquered or enameled cans.

Advantages of the Method

The freezing preservation of citrus-fruit purees has proved to be a highly efficient and economical method for the preparation of fruit bases possessing natural flavors, color, and nutritive value. These fruit bases can be kept in good condition at 0 F. for more than a year, and with very little, if any, loss of the original vitamin C. content. The pureeing of citrus fruits possesses two distinct advantages. First, sugar added to the puree dissolves in the juice and comes in intimate contact with the fruit cells, which are surrounded by a coating of sirup. Second, the product thus prepared forms a solid mass after freezing, which helps to exclude air. The frozen puree can be defrosted, some of it used, and the rest re-frozen without injury to color and flavor, provided it is not exposed to the air for long periods and the temperature of the product is not allowed to rise too high.

If a fruit-processing plant includes the freezing preservation of citrus purees, its operating season can be extended over longer periods. For example, the fruit-freezing plants in Southern California shut down after the last fruit crops have been harvested. They can continue their operations by freezing citrus purees up to November, using California Valencias, and even later in the season, using Arizona Valencias and Arizona "Sweets." Lemons can be processed in almost any month during the year. The pureeing of citrus fruits for freezing preservation has a distinct advantage for the grower, since fruit having good color and flavor can be utilized regardless of its shape, size, or superficial blemishes which make it unfit for the fresh market. Such a method may aid in utilizing a larger percentage of the citrus crop than is now experienced.

Navel oranges have never been successfully used for the processing of citrus products, since this orange variety contains substances which turn bitter after the juice has been extracted. It has been found that Washington Navel oranges can be pureed, frozen and held for several months at subzero temperatures without any noticeable evidence of the characteristic bitter flavor. Frozen Navel orange purees and sherbets made from the puree have been successfully prepared on a commercial scale. However, on prolonged storage there is a tendency for them to jell, and experiments are now under way to study the causes of this jelling and to work out means of preventing it.

Extracted from Circular AIC 278 of the same title, August 1949, U. S. Department of Agriculture.

Mexican Shrimp Shipped by Plane

SHRIMP is being shipped by air from Carmen, Mexico to Miami, Fla., where it is frozen and shipped from there to various points throughout the United States. Transportation is handled by Nation-wide Transport Service, Inc., Miami. The planes carrying loads of 6,500 lbs. make the trip to Miami in about five hours. One of the largest shipments was 10,000 lbs. delivered to East Coast Fisheries, Miami.

Frozen Food Packers Make Plans For More Merchandising Data

THE frozen food industry has now grown to the point where more detailed and accurate information should be provided as to markets, specific holdings and movement of frozen products, and availability of frozen items in different container sizes. That was the decision reached by directors of the National Association of Frozen Food Packers at a recent meeting at the Washington headquarters of the association. The NAFFP Board agreed that such marketing data, if available, would be of immense aid to all branches of the industry in planning production and sales programs. After full discussion, the Washington staff of the association, headed by Secretary Lawrence S. Martin, was instructed to look into the development of a long-range plan for obtaining the statistics necessary for a thoroughgoing marketing program. NAFFP President A. J. Rogers was authorized to appoint a committee to assist in planning such a program if it appears advisable to do so.

Present Figures Inadequate

Various government agencies now collect frozen food statistics, but by and large these figures have been found inadequate to meet the needs of the fast-growing industry. At the same time, such agencies as the U. S. Department of Agriculture and the U. S. Department of Commerce have not had funds to expand their programs of statistical and marketing data to collect the specific information the frozen food trade urgently needs.

NAFFP directors are not unaware of the difficulties of setting up a marketing statistics program or of the ultimate expense that may be involved, but they decided to explore the situation to see whether initial steps cannot be taken toward such a broad program.

Directors present at the Washington meeting besides Mr. Rogers and Mr. Martin were association vice president G. O. Bailey, and these Board members: C. W. Cedergreen, T. E. McCaffray, J. S. Lawless, C. J. Meister, R. O. Dulany, W. Ed Booker, C. D. Farquhar, C. H. Bateman and F. J. Becker.

The Board heard a report on the progress of another aspect of NAFFP activities, the so-called Consumer Information Program, designed to make housewives and other consumers conscious of the advantages of frozen products. This phase of the Association's work is directed by Mrs. Margaret Truby, home economist and authority on frozen food cookery. Promotional releases, recipes and photographs are now going to women's magazines and newspaper food pages throughout the country and the response has been gratifying, according to Mr. Martin. The NAFFP is planning to bring out a brochure to describe the program and the advantageous results that have been obtained from it.

Freezers and Freezer Storage Added to Port of Tacoma Plant

(Continued from page 28)

grees, and Port records show that the thermostats open only once in 24 hours, indicating efficient operation.

G. W. Osgood, chief engineer for the Port of Tacoma, served as chief engineer on the construction of the addition. The engineer-architects were Smith and Murray, Tacoma. The general contractor was Construction Engineers and Contractors, Tacoma. Fiberglas insulation was installed by Cork Insulation Co., Seattle.

Court Decisions

(Continued from page 36)

Corporation Liable on Contract Made by Officers or Agents

According to a recent higher court an ice corporation is bound by contracts made by its officers and agents for its benefit provided they act within scope of their express or implied powers. This is so although the directors of the corporation do not approve the contract.

For example, in Morgan v. Cedar Grove Ice Company, 41 So. (2d) 521, the evidence proved these facts: The Cedar Grove Ice Company represented by one Spencer, its president and general manager, entered into a contract with one Morgan in which the ice company agreed to sell to Morgan 15 tons each day of Grade A, merchantable ice during the four months summer season at the price of $3.25 per ton. For nearly four weeks the ice company delivered 15 tons of ice daily to Morgan at $3.25 per ton. Then the company refused to make any further deliveries, and Morgan sued to recover damages.

The counsel for the ice company contended that the contract upon which the suit was based was invalid for the reason that Spencer, who signed in behalf of the Cedar Grove Ice Company as its president and general manager, had no authority to represent the corporation and was not duly authorized by resolution of its board of directors. Nevertheless the higher court held the ice company liable for breach of the contract, and said:

"Defendant (Cedar Grove Ice Company) was engaged in the business of manufacturing and selling ice. The contract in the instant case was in the scope of defendant's business and was of an ordinary nature and in the usual course of the business of the corporation. The contract was one which was within the apparent or implied authority of Spencer, as president and general manager of the corporation."

Carloadings Forecast Record Rail Movement of Frozen Foods

THE number of refrigerator cars loaded with frozen food products will set an all-time record for 1949, according to estimates of the Association of American Railroads. Based on estimated railroad car loadings of frozen foods, fruits and vegetables for the first three quarters of 1949 and a new calculation for the final quarter, a total of 12,764 carloads of these products will be shipped this year. That compares with actual carloadings of 11,845 cars of frozen foods in 1948, and 12,056 carloads in 1947, the previous peak year. It will be almost double the loadings of 6,422 cars for 1946.

The estimates are made by the 13 Regional Shippers Advisory Boards covering every part of the country. The Boards recently forecast that fourth quarter carloadings of frozen foods would total 3,887 cars, compared with 3,246 cars for the corresponding quarter a year earlier. This increase of 19.7 percent represented the biggest anticipated year-to-year increase for any of the 30-odd commodity groups handled by the Shippers Advisory Boards.

Although the carloadings estimates have been compiled for many years, a category for frozen foods has been included only since 1946. The index is important so far as the frozen food industry is concerned, for it furnishes a reliable guide as to movement of frozen products from freezing centers to warehouses and to consumer channels. Most of the movement is normally from the Pacific Coast to the Middle West and the East, and along the Atlantic seaboard.

Refrigerated Storage Costs

(Continued from page 33)

With an inventory of all motorized equipment which gives the operating characteristics of each the motor, losses can be easily calculated. In the next article details of a Register of Motorized Equipment will be fully described.

Completing Form 2

We are now ready to complete Form 2. The heat loss factors used in connection with air changes, men working in the room, lights burning and motors running have been taken from the reference books mentioned above. Tables and charts give the number of air changes that can be expected for various room sizes and the number of Btu per cu. ft. of space which must be removed under different conditions of temperature and humidity are also shown in the same reference. Each man working in the room is assumed to generate 750 Btu per hour, the lamps 3.24 Btu per watt-hour and the motors, 3,000 Btu per horsepower-hour.

The Summary of Rooms Losses covers the total losses in the room for two different outside temperatures and two different humidities. These figures are then converted to the number of tons of refrigeration required per day to compensate for their effects.

When Form 2 has been filled out for each room the final figures are recapitulated by classes of room—coolers, freezers and sharp freezers. Below are the results for our hypothetical house:

RECAPITULATION OF LOSSES IN TONS OF REFRIGERATION PER DAY

Outside Mean Temp.	30 F		80 F	
Relative Humidity	50%	60%	50%	60%
All Coolers	1.65	1.62	13.00	13.29
All Freezers	11.25	11.07	21.50	21.98
All Sharp Freezers	2.00	1.97	2.50	2.56
Total for All Rooms	14.90	14.66	37.00	37.83

When the temperature for a given month is neither 30 nor 80 F it is not necessary to go through all the calculations shown in Form 2 to arrive at the losses in each class of rooms for the month. Since there is a spread of fifty degrees between the two sets of figures shown it is sufficiently accurate to take one-fiftieth of the difference between the reading for 30 F and the reading for 80 F as the change for one degree difference in outside mean temperature. Thus, if the value of the cooler losses for an outside mean temperature is wanted just add to the value of the reading for 30 F the value found for one degree difference multiplied by ten. In fact, it is advisable to prepare a table showing the value of the losses for each degree of temperature which may be reported for the locality by the Weather Bureau. A form is not shown for this purpose because any columnar-ruled paper can be used for such a record. In the vicinity of New York city such a table has a range by degrees from 20 to 90 F.

Community Chilling and Freezing Next Month

In order to complete the information needed to calculate refrigeration requirements for a given month, we must cover the subject of commodity chilling and freezing. This phase of cost work will be discussed in the next article of this series.

ASRE Annual Meeting — Technical Papers and Conferences

AN extensive list of technical papers and three engineering conferences on specialized problems of the refrigeration industry are expected to produce a record turn out for the 45th Annual Meeting of the American Society of Refrigerating Engineers at Chicago's Edgewater Beach Hotel December 4 to 7.

The inclusion of the three conferences in addition to the regular four technical sessions at the ASRE meeting will provide one of the most diversified and popular programs in many years. These conferences are (1) the household refrigerator conference at which the use of plastics will be discussed; (2) a water re-use symposium concentrating on means for conserving water used in refrigeration and air conditioning; and (3) a conference on the design and applicability in multi-room buildings of room air conditioners. Chairmen of the three conferences in the order listed are O. E. Norberg of Crosley Division,, Arthur J. Hess of Hess, Greiner, and Polland, Los Angeles, and H. L. Laube of Remington Corporation.

Each of these conferences will follow the procedure established at the last two meetings of the Household Refrigerator Engineering Conferences—namely, a paper on the general subject will be read by an outstanding authority in the field and then leaders from many refrigeration firms will be asked to discuss the salient points brought up in the paper.

Twelve technical papers will be given at four plenary sessions of the Society and will cover subjects ranging from a description of the huge low temperature installation at the Eastman Kodak works in Rochester, N. Y., to an explanation of the mysterious Hilsch vortex tube that blows cold air out one end and hot air out the other.

The annual meeting will feature the usual social activities which will include a welcome luncheon and distinguished speaker, the perennial dinner dance, and inspection trips. Two meetings of the Society's governing council are scheduled as well as many meetings of technical committees now at work on new and revised codes and standards for rating and testing refrigeration equipment.

The meeting which will begin on Sunday, December 4, will wind up at noon Wednesday, December 7, with the installation of new officers. Those nominated for 1950 are President, J. G. Bergdoll Jr., York Corporation; Vice Presidents, P. B. Christensen, Merchants Refrigerating Company, and Edward Simons, Consulting Engineer, and Treasurer, R. C. Jordan, Professor of Mechanical Engineering, University of Minnesota.

Supplement to Equipment Standards

THE Air Conditioning and Refrigerating Machinery Association announces the publication of the 1949 Supplement to Acrma's Equipment Standards. This 1949 Supplement includes the following seven new or revised equipment standards:

Room air conditioners

Self-contained air conditioners

Open-type refrigeration condensing units for commercial application (air and water cooled, 20 hp. and smaller).

High-speed ammonia compressors

Application of refrigerant heat transfer equipment

Water-cooling towers for use with refrigerating equipment

Application and Installation of Compression Refrigeration Systems

The new publication is priced at $1.00 per copy.

Member Activities

(Continued from page 57)

The seven new members enrolled at the September 21 session were: Charles R. Baxter, Raymond Flowers and Douglas Blair of Union Ice Co.; H. G. Kyle of Union Packing Co.; John D. Caldwell, General Fruit Co.; E. A. Padon, Royden Ice Co.; and Richard A. Colin, Huntington Park.

Merchandise prizes were awarded by Chairman Burnett to those rating high in point of signing up new members. To George Hill of California Consumers Corp., for signing up 15 new members, was presented a case of oranges, case of tuna, and believe it or not, a gold fish with a week's supply of food, with, however, no advice as to what George was to do with the beast. Cases of tuna and miscellaneous other prizes also went to Donald Byl of Union Ice Co., who signed up 27 new members; Elmer Johnson, California Consumers Corp., who persuaded 20 to sign on the dotted line and to Cliff Nordholm, H. N. Royden, and others.

At the conclusion of his report, Chairman Burnett was given a standing vote of thanks for the superb job he had done in managing the membership drive.

The chapter voted to change the date of the Pre-Convention Rally and Jamboree from Nov. 2 to Nov. 9 to avoid conflict in dates with affairs planned by other refrigeration groups. Admission to the Jamboree has been limited to 250. Proceeds are to be ear-marked as an expense fund for the 1950 NAPRE convention in Los Angeles.

Chairman William Losch of the National Convention Committee reported some $700 already assembled for the convention fund. Losch reported that the winner of a Philco television set presented by the National Convention Committee was J. P. Anderson of Inglewood, California, a member of the staff of the Fairbanks-Morse Co.

Secretary George H. Paulick read a letter from national headquarters in which were set forth details of a proposal to increase initiation fees from $5.00 to $10.00. The matter was referred for joint study and later recommendation of chapter action to the finance committee, advisory board and board of directors.

Arthur Hess, general chairman of the Jesse C. Blair Foundation, was unable to attend the meeting, but sent a report on the status of the project to establish a Blair Memorial Library and Laboratory for refrigeration study advancement. The report, read by Secretary Paulick, indicated that encouraging progress has already been made to assure the ultimate success of the project, the next immediate step being the assigning of speakers to address various refrigeration groups at their monthly meetings. This phase of the project will get underway by the appearance of a project speaker at Los Angeles NAPRE Chapter's October meeting.

A paper on "Heat Pumps," prepared by Arthur Hess of Hess, Greiner & Pollard, Los Angeles air conditioning firm, and read by Secretary Paulick, was the highlight of the educational session.

Class Instructor Elmer Johnson reactivated the preliminary class after two-months summer interlude, with a one-hour instruction period on the subject of "Heat Exchangers for Cooling Liquids."

Department of Agriculture Purchases Apples for School Lunch

THE U. S. Department of Agriculture has announced that it will purchase apples in all the important commercial producing areas for distribution in the National School Lunch Program. Total amount of apples to be purchased has not yet been determined, but the rate of purchase will be based on the capacity of the School Lunch Program to absorb the fruit. Purchase operations will begin in the near future and prices will be announced at that time. State PMA offices will make the purchases locally and will handle details of the purchase program.

The Department also announced that it will develop an export payment program, designed to stimulate exports of apples and winter pears.

Book Review

HEAT TRANSFER (Vol. I). By Max Jakob, Research Professor of Mechanical Engineering, Illinois Institute of Technology. Published by John Wiley & Sons, Inc., New York. 758 pages. Illustrated. Heavy Cloth binding. Price $12.00. For sale by Nickerson & Collins Co., Chicago, Ill.

This book which is devoted mainly to the fundamentals of heat transfer, is the first of two volumes. It was written as an international survey of heat transfer development for those interested in the mathematical, physical or engineering aspects and is expected to be useful as a treatise for research workers and as a textbook for graduate and intermediate teaching. The author, Dr. Max Jakob is a graduate of The Royal Institute of Technology in Munich. He fled Nazi Germany in 1937 and joined the Illinois Tech. faculty the same year. Previously he had been engaged for many years in analyzing the literature, doing research and teaching heat transfer. Recently he was awarded an Honorary Degree of Doctor of Engineering by Purdue University.

Food Freezer Section REMA Meets

AT A MEETING of the Food Freezer Section of the Refrigeration Equipment Manufacturers Association held in Washington, D. C., September 14 the name of the Product Section was definitely changed to Food Freezer Section.

A number of motion pictures and slide films were reviewed, and it was decided that the group would sponsor either a colored motion picture or a colored slide film entitled, "A New Way To Live", which will be offered to colleges and high schools having home economic courses. It is also expected that these films, when completed, will be circulated through service clubs, churches, women's clubs, and other organizations. The promotion is still in the planning stage, but it is expected to include a national contest among home economic students.

The Section also expects to set up a Speakers' Bureau made up of its members who will give educational talks on the preservation of food through the use of food freezers before any interested groups.

Existing standards for food freezers will be studied by a committee consisting of W. L. Currie, Victor Products Corp., Chairman; Sven Swanson, Tyler Fixture Corp.; C. H. Beane, The Brewer-Titchener Corp.; Steve Frank, Jr., Whiting Corp.; and Raymond D. Pusey, Wilson Cabinet Co., Inc. A report will be made at the next meeting when a standard may be adopted.

Upon adoption of the standard by the Food Freezer Section, and subsequently by REMA, it is expected that an industry seal will be approved and used by all manufacturers who are members of the Association, upon proper testing and approval of their various models. Another subject discussed at length, and upon which mutual experiences were exchanged, was the topic of insurance covering food spoilage and machanical failure.

The next meeting of the Section will be held January 9, 1950.

Florida Ice Exempt From Sales Tax

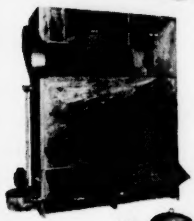
SALES of ice will be exempt from a 3 per cent limited state sales tax given final approval (Sept. 24) by a special session of the Florida Legislature and sent for signature to Gov. Fuller Warren. The sales tax act, which will be enforced by the state comptroller, contains a "use tax" provision to prevent evasion through out-of-state purchases.

ACME PRODUCTS

INDUCED DRAFT COOLING TOWERS

Dry-Ex Water Chillers

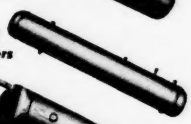
Freon and Ammonia Condensers



Evaporative Condensers

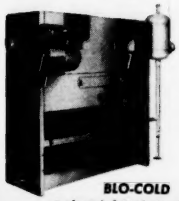
Oil Separators

Shell and Coil Condensers



Liquid Receivers

Heat Exchangers



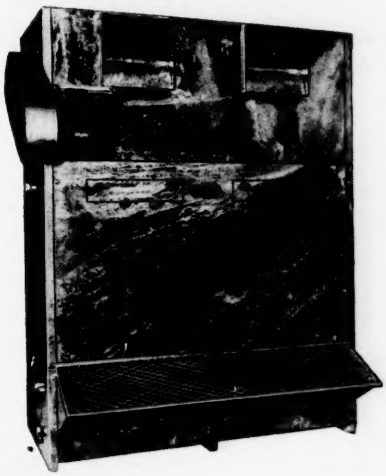
BLO-COLD Industrial Unit Coolers

Acme TAKES PRIDE—

—in announcing a new addition to a distinguished line of air conditioning and refrigeration products—the Induced Draft Cooling Tower.

Carefully designed and engineered to meet the high standards of Acme products—yet moderately priced through skillful manufacturing methods, Acme Induced Draft Cooling Towers are now available in sizes and capacities from 3 to 40 tons. You'll find many improvements and refinements over ordinary cooling towers. For example, the cooling pads are made of a new non-metallic material and ***will not corrode.*** Pads will hold water in suspension and give an extensive wetting surface with a minimum of bulk. Towers are easily accessible and serviced. Like the Acme Evaporative Condenser, all metal parts are ***hot-dip galvanized after fabrication.***

But you'll want to have all the details. New catalog No. 40 is just off the presses. Write for yours today.



ACME INDUSTRIES INC.

Jackson, Michigan

Representatives in principal cities

Serving the Refrigeration Industry since 1919

COMING CONVENTIONS

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS
November 8, 9, 10, 11, 1949
Purdue University, Lafayette, Ind.
EMERSON BRANDT, Secretary

CANADIAN ASSOCIATION OF ICE INDUSTRIES, INC.
November 8-10, 1949
General Brock Hotel, Niagara Falls, Ont., Canada
K. C. MCCREA, Executive Secretary

ALL INDUSTRY EXPOSITION
November 14-18, 1949
Traymore Hotel, Atlantic City, N. J.
GEO. MILLS, Director

NATIONAL ASSOCIATION OF ICE INDUSTRIES
November 15, 16, 17 and 18, 1949
Hotel Commodore, New York, N. Y.
MOUNT TAYLOR, Secretary

KENTUCKY ICE MANUFACTURERS ASSOCIATION
November 21-22, 1949
Seelbach Hotel, Louisville, Ky.
RUSSELL T. KING, Secretary

DELTA STATES ICE ASSOCIATION
November 28-30, 1949
Buena Vista Hotel, Biloxi, Miss.
R. N. MILLING, Secretary

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS
December 4-7, 1949
Edgewater Beach Hotel, Chicago, Ill.
M. C. TURPIN, Secretary

SOUTH CAROLINA ICE MANUFACTURERS ASS'N.
December 5-6, 1949
Poinsett Hotel, Greenville, S. C.
GEO. L. ENGLISH, Secretary

SOUTHWESTERN ICE MANUFACTURERS' ASS'N.
December 7-9, 1949
Plaza Hotel, San Antonio, Texas
PRESTON A. WEATHERRED, Executive Secretary- Counsel

CALIFORNIA ASSOCIATION OF ICE INDUSTRIES
December 13-15, 1949
San Francisco, Calif.
L. A. BAILEY, Exec.-Secy.

ILLINOIS ASSOCIATION OF ICE INDUSTRIES
December 14-16, 1949
Jefferson Hotel, Peoria, Ill.
W. D. WRIGHT, Secretary

MISSOURI ICE MANUFACTURERS ASSOCIATION
January 9, 10, 11, 1950
Hotel President, Kansas City, Mo.
V. A. ESPHORST, Secretary-Treasurer

GEORGIA ICE MANUFACTURERS ASSOCIATION
January 18-19, 1950
Ansley Hotel, Atlanta, Ga.
WILLSHIRE RILEY, Secretary

SOUTHERN ICE EXCHANGE
January 18-19, 1950
Ansley Hotel, Atlanta, Ga.
WILLSHIRE RILEY, Secretary

AMERICAN WAREHOUSEMEN'S ASSOCIATION
January 30-February 2, 1950
Edgewater Beach Hotel, Chicago, Ill.
WILSON V. LITTLE, Secretary

NATIONAL ASS'N. REFRIGERATED WAREHOUSES
January 30-February 2, 1950
Edgewater Beach Hotel, Chicago, Ill.
WM. DALTON, Executive Vice-president

NATIONAL ASSOCIATION FROZEN FOOD PACKERS
February 1-3, 1950
Congress Hotel, Chicago, Ill.
LAWRENCE S. MARTIN, Secretary

OHIO ASSOCIATION OF ICE INDUSTRIES
February 27-28, 1950
Deshler-Wallick Hotel, Columbus, Ohio
GUY W. JACOBS, Secretary-Treasurer

MICHIGAN ICE INDUSTRIES ASSOCIATION
March 2-3, 1950
Hotel Morton, Grand Rapids, Mich.
W. J. CAMPBELL, Secretary

INDIANA ASSOCIATION OF ICE INDUSTRIES
March 8-9, 1950
Lincoln Hotel, Indianapolis, Ind.
RORT. W. WALTON, Secretary

NORTH CAROLINA ICE ASSOCIATION
March 6-7, 1950
Sir Walter Hotel, Raleigh, N. C.
LEWIS H. POWELL, Secy.-Treas.

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AMERICAN INSTITUTE OF REFRIGERATION
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Mount Taylor, Secretary, 1706 L St., N. W., Washington 6, D. C.

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MICHIGAN ICE INDUSTRIES ASSOCIATION
Wm. J. Campbell, Secretary, Pleasant St. at Campbell, Belding, Mich.

MISSOURI ICE MANUFACTURERS' ASSOCIATION
A. V. Esphorst, Secretary, 3820 Washington St., St. Louis, Mo.

MOUNTAIN STATES ASSOCIATION OF ICE INDUSTRIES
J. R. Espy, Secretary, Espy Ice Co., 2229 - 15th St., Denver, Colo.

NEBRASKA ASSOCIATION OF ICE INDUSTRIES
Frank Vogelsang, Secretary, W. T. Good Ice Co., Lincoln, Nebr.

NEW ENGLAND ICE ASSOCIATION
Raymond Wilber, Secretary, 419 Boyleston St., Boston, Mass.

NEW YORK STATE ASSOCIATION OF REFRIGERATED WAREHOUSES
Chas. G. Ashe, 101 Columbia St., Buffalo 5, N. Y.

NORTH CAROLINA ICE ASSOCIATION
Lewis H. Powell, Secretary, Capital Ice & Coal Co., Raleigh, N. C.

NORTHWEST ASSOCIATION OF ICE INDUSTRIES
D. D. Stewart, Secretary, American Bank Bldg., Seattle, Wash.

OHIO ASSOCIATION OF ICE INDUSTRIES
Guy W. Jacobs, Secretary, The Steubenville Ice Co., Steubenville, Ohio

OKLAHOMA ASSOCIATION OF ICE INDUSTRIES
W. A. Hadley, Secretary, 242 Key Bldg., Oklahoma City, Okla.

PACIFIC STATES COLD STORAGE WAREHOUSEMEN'S ASSOCIATION
L. A. Bailey, Secretary, 461 Market St., San Francisco, Calif.

SOUTH CAROLINA ICE MANUFACTURERS' ASSOCIATION
Geo. L. English, Secretary, P. O. Box 603, Columbia, S. C.

SOUTHERN ICE EXCHANGE
Wilshire Riley, Secy.-Counsel, 421 Rhodes Building, Atlanta, Georgia

SOUTHWESTERN ICE MANUFACTURERS ASSO.
P. A. Weatherred, Secy. Connsel, Mercantile Bank Bldg., Dallas, Texas

TENNESSEE ICE MANUFACTURERS' ASSOCIATION
W. E. Harlan, Secretary, Mt. Pleasant Ice Co., Mt. Pleasant, Tenn.

TRI-STATE ASSOCIATION OF ICE INDUSTRIES
L. R. Girton, Secretary, 260 Boyce-Greeley Bldg., Sioux Falls, S. D.

VIRGINIA ICE MANUFACTURERS' ASSOCIATION
H. H. Snyder, Secretary, Alexandria, Va.

WEST VIRGINIA ASSOCIATION OF ICE INDUSTRIES
E. Dana Smith, Secy., Diamond Ice & Coal Co., Charleston, W. Va.

WISCONSIN ASSOCIATION OF ICE INDUSTRIES
Paul F. Hoff, Secretary, 1300 East Locust St., Milwaukee, Wis.

SPECIFICATIONS ON ICE STATION

ALL AIRCRAFT ALUMINUM CONSTRUCTION: Outside structure, .051 aluminum; dead air space; .032 Aircraft aluminum; permanently secured Fibre glass insulation; inside structure, .051 Aircraft aluminum. Vapor sealed throughout.

REFRIGERATOR DOOR: .051 Aircraft aluminum construction well insulated with batts of Fibre glass.

REFRIGERATION: 1½ H. P. condensing unit with banks of vacuum cold plate evaporators (more effective than coils). Guaranteed to maintain below freezing temperature with outside temperatures of 100°.

COIN MECHANISM: Lever operated, positive delivery, rejects slugs; also returns money when machine is empty.

PAT. PENDING

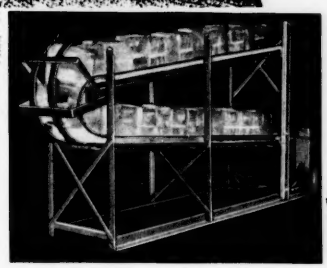
FRIGID-VEND AIRCRAFT ALUMINUM ICE STATION

Vends Blocked Cubed and Sized Ice

The Frigid-Vend Ice Station is in a class by itself because of its all Aircraft aluminum construction. Lighter in weight, it comes to you already assembled and mounted on skids ready to slide onto foundation.

Vending mechanism is positive and fool-proof. Vending lever is clutch operated, preventing breakage of handle and damage to mechanism. A customer, after insertion of money, can receive only one unit of ice at a time. Jackpot operation is impossible. Coin mechanism rejects slugs and returns money when machine is empty. In appearance, and in profitable operation, a complete Frigid-Vend Ice Station is all you could ask for.

The Station will vend four kinds of ice, two sizes of blocked ice as well as cubes or crushed ice in bags or packages. Or if you prefer you can vend any smaller combination of these four types.



GRAVITY ACTION DOUBLE DECK ICE BLOCK VENDORS

All steel construction with stainless steel covered tracks. ½ H. P. motor with gear head operates tripper bars during vending operation.

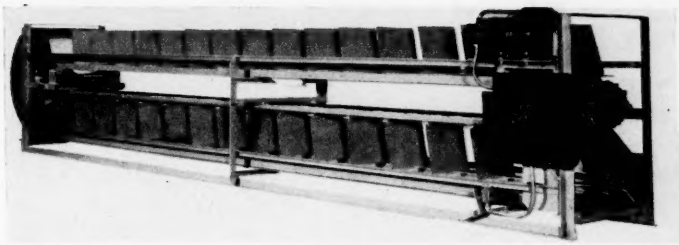
Capacity: 25 lb. ice blocks model—27 or 54 blocks
50 lb. ice blocks model—19 or 38 blocks

FRIGID-VEND BAG, PACKAGE AND ICE BLOCK VENDORS CAN BE PURCHASED SEPARATELY FOR INSTALLATION IN ANY ICE STORAGE ROOM.

Before You Buy, Get All the Facts. Write for information. Prompt delivery on all Frigid-Vend Equipment.

THERMO CUBER

THERMO CUBER CO., INC. 2120-2124 N. SOUTHPORT AVE., CHICAGO 14, ILL.



Frigid Vend
Model 2-A-15
Bag Vendor
Capacity 32 bags

See us at
Booth 40
N.A.I.I. Convntion
Commodore Hotel
Nw York City
Nov. 15-18

NEW PLANTS AND IMPROVEMENTS

Information pertaining to proposed new plants utilizing refrigerating equipment, as well as additions, improvements, and rehabilitation of existing plants. News regarding such new plants and additions is invited for publication in this department.

ALABAMA

Birmingham, Ala.—Davis Ice & Fuel Co., recently had a Lilly Icizer Model No. 13B8 installed in its plant here.

CALIFORNIA

Los Angeles, Calif.—Los Angeles Harbor is modernizing the Municipal Fish Markets at a cost of $577,000 and moving them from Berths 79-80 to the new $1,265,000 Fishermen's Wharf just completed along Main Channel at Berth 72, San Pedro district. Completion of the 420x80 ft. two-story building, according to the contract, will be within nine months.

Manteca, Calif.—The old Valley Express terminal building has been converted into a huge cold storage plant. The first unit completed was packed with pears grown in the Placerville area and in Lake county. The structure is 425 by 70 ft. and was converted by the Eckert Engineering Corp., of San Francisco. L. S. Eckert is the president, and L. G. Burdick the general manager.

Mount Shasta, Calif.—Shasta Daisy Ice Co., is opening a self-help ice station next to Vietti's Market.

CANADA

Toronto, Ont., Canada— A Lilly Icizer Model No. 23CE9 and Feeder has been installed in the plant of the Belle Ewart Ice & Fuel Co.

Toronto, Ont., Canada—Lake Simcoe Ice & Fuel Co. Ltd., recently purchased two Lilly machines—an Icizer Model No. 23CE13 and Breaker Model No. 23.

FLORIDA

Winter Haven, Fla.—The Polk Packing Co. headed by John A. Snively, recently announced that plans are being drawn for a frozen concentrate plant to be added to the present hot pack concentrate section of the giant citrus house. The firm signed a contract with Birds-Eye-Snider, a division of General Foods, to produce an unannounced quantity of frozen concentrate to be marketed under the Birds Eye label.

ILLINOIS

Cairo, Ill.—Public Ice Service recently purchased a Lilly Icizer Model No. 13CE8.

INDIANA

Hagerstown, Ind.—Consumers Ice & Fuel last month installed a Sturdy-Built Ice Vending Station, Model 16-A, equipped with S & S ice vending machines. The station was delivered from the Des Moines, Iowa, plant of the F. B. Dickinson Co.

Indianapolis, Ind.—Polar Ice & Fuel Co., has completed installation of eight new S & S ice vending machines. The units, installed in existing retail depots, are for dispensing 10 and 25 lb. bags of prepared ice.

Jefferson, Ind.—The Jefferson Ice & Fuel Co., here has installed a Lilly Icizer Model No. 13CE11.

Lafayette, Ind.—A Lilly Icizer Model No. 13CE11 was recently installed at the plant of the Lafayette Ice & Coal Co.

Marion, Ind.—A new meat packing firm has been organized here by Jack A. Bergman and Howard S. Leonard who have leased the Good Packing Co., property one mile east on Monroe pike.

IOWA

Postville, Ia.—A $300,000 packing plant here has gone into operation according to Fred Groth,, president and general manager. The main building is two stories, 240 by 60 ft. and houses offices, coolers and processing rooms. The project is financed by 193 stockholders.

KENTUCKY

Fulton, Ky.—Fulton Ice Company has a new Lilly Icizer Model No. 13B8.

MAINE

Portland, Me.—A Lilly Icizer Model No. 13CE11 was recently installed in the plant of the Portland and Sebago Ice Co.

MASSACHUSETTS

South Harwich, Mass.—Red River Associates have installed a Lilly Icizer Model No. 13B8.

MEXICO

Guaymas, Sonora—American engineers and technicians have completed preliminary plans for the erection of a huge meat refrigeration and packing plant in the Gulf of California port. Financed by a bloc of members of Sonora Cattlemen's Association, the plant will cost an estimated 5,000,000 pesos. It is reported that the plant has already signed contracts to supply beef to Greece. The beef will be processed here and sent to Europe in refrigerated ships.

MICHIGAN

Detroit, Mich.—Detroit City Ice & Fuel Co., has taken delivery of another Sturdy-Built Ice Vending Station, Model 20-A. F. B. Dickinson Co. of Des Moines, Ia., supplied the unit.

MISSISSIPPI

Biloxi, Miss.—Biloxi Freezing Co., has had a Lilly Icizer Model No. 13B8 installed in their plant here.

Gulfport, Miss.—The Lilly Co. of Memphis, Tenn., recently installed a Lilly Icizer Model No. 13B8, in the plant of Bay Ice Co. here.

Jackson, Miss.—A Lilly Icizer Model No. 8A5½ has been placed in operation in the plant of the Home Ice Co.

MISSOURI

Carthage, Mo.—Carthage Ice & Cold Storage Co., has installed a Lilly Icizer Model No. 13CE8.

Independence, Mo.—The Independence Ice and Creamery Co., has installed an S & S ice vending machine.

St. Louis, Mo.—Additional S & S ice vending machines have been installed by City Products Corp., of this city. Block ice as well as 25 lb. packaged ice units are now in use.

Springfield, Mo.—Construction of a 56 by 20 ft. concrete loading platform for the Springfield Ice and Refrigerating Co., on West Mill, has just been completed. Dan Diesel, manager, said the new platform was made necessary for the convenience of trucks, which are longer and need more space. The project, constructed by Chapman and Bramer, cost about $20,000.

NEVADA

Las Vegas, Nev.—Polar Ice Co., has installed a Lilly Icizer Model No. 13CE8.

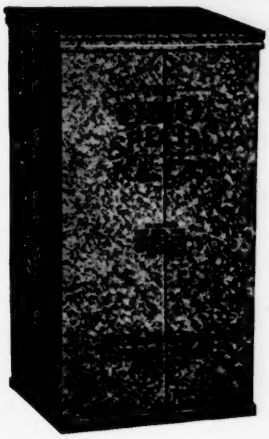
NEW YORK

Long Island, N. Y.—The Great Nick plant of Knickerbocker Ice Co., has installed additional S & S ice vending machines for dispensing processed ice in paper bags as well as block ice in 25 lb. pieces.

OHIO

Parma, Ohio—A Lilly Icizer Model No. 13B8 has been delivered to the Walter Ice Co., here by The Lilly Company, Memphis, Tenn.

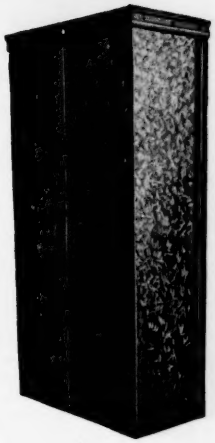
OHIO SPECIAL ICE CANS



Double Riveted
Welded
Integral Tube Cans
Arctic Pownall Cans
Can Baskets
Condenser Trough

• • • • • • • • • • •

Industrial Trucks
and Trailers



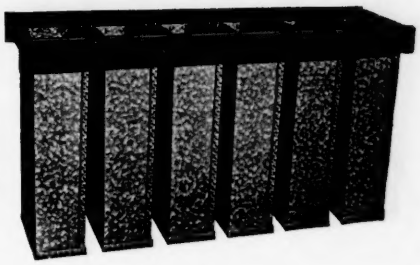
SHELL BRINE OR COIL TYPE FOR ANY NUMBER OF CANS

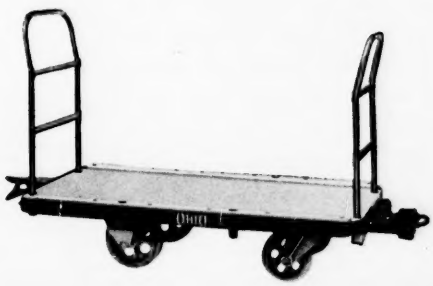
Any one can removable by taking out four rivets.

Arranged for high pressure or low pressure air laterals.

A properly designed basket for each type of tank or air system.

Black or Galvanized as required.





OHIO No. 2001 TRAILERS

ONE PIECE TEE SECTION STEEL FRAME
OHIO AUTOMATIC COUPLERS
RACKS INTERCHANGEABLE SIDES AND ENDS
WOOD OR STEEL DECK—RUBBER TIRES
TWO TON CAPACITY—PROMPT SHIPMENT

WRITE FOR CATALOG

THE OHIO GALVANIZING & MFG. CO.
NILES *Established 1902* **OHIO**

MERCOID

SOLVES INDUSTRY'S AUTOMATIC CONTROL PROBLEMS

FOR REFRIGERATION AND FOOD PROCESSING APPLICATIONS

LOW VOLTAGE THERMOSTATS

Mercoid low voltage thermostats known as Sensatherms, are particularly adaptable to air conditioning and refrigeration equipment. They are very sensitive, small in size and neat in appearance. Total operating differential is 1 degree F., being adjustable to as wide as 5 degrees F. These instruments will handle 20 watts or less on 110 or 220 volts without the use of a relay.

LINE VOLTAGE THERMOSTATS

The No. 855 Mercoid thermostats will directly handle the full motor load without the use of a relay. They are recommended for such applications as cooler rooms, florists' cabinets or butcher cases. Available in a variety of ranges to suit all requirements. Furnished standard with adapter plate for attachment to standard wall switch boxes. Electrical capacity 10 amp. 115 volts, 5 amp. 230 volts

HIGH PRESSURE CONTROL

Type DA-51 for control of Freon, Methyl Chloride Sulphur Dioxide or any other refrigerant not injurious to bronze. Equipped with outside double adjustments. Adjustable from 0 to 200 pounds. Minimum differential 8 pounds. Maximum operating pressure 240 pounds.

LOW PRESSURE AMMONIA

Type DA-61 provides close regulation of Ammonia refrigeration equipment from changes in suction pressure. By means of this control the regulation of individual box temperatures is adjustable from 10" vacuum to 75 pounds pressure and will withstand a maximum pressure of 150 pounds. Equipped with external adjustments.

REMOTE STEM TEMPERATURE

Type DA-55 is recommended for refrigeration and air conditioning applications. It is suitable for the control of brine, water, or low air temperatures in freezing rooms. Equipped with Bourdon tube power element, vapor pressure operated—external adjustments for setting range and differential—heavy steel case with black enamel finish—copper tubing and bulb. Where close differentials are desired Type DA-255-3 is used.

TRANSFORMER-RELAYS

Type V Mercoid Transformer-Relay is a reliable low voltage relay which also acts as a transformer. They are designed to meet severe operating conditions encountered with automatic refrigeration equipment. There is no hum or chatter, nor can there be any residual magnetism. These relays are particularly adaptable to air conditioning applications where quietness is essential.

All Mercoid Controls are equipped exclusively with mercury switches —assuring better control performance and longer control life

Write for Mercoid Catalog No. 600A

THE MERCOID CORPORATION, 4203 W. BELMONT AVE., CHICAGO 41, ILL.

PENNSYLVANIA

Pittsburgh, Pa.—Consolidated Ice Co. recently installed a Sturdy-Built Ice Station, Model 20-V, equipped with four S & S vending machines . The station built by F. B. Dickinson Co., is designed to dispense 25 and 50 lb. pieces as well as 10 lb. bags of both sized and cubed ice.

Uniontown, Pa.—North Pole Ice Co., is now offering 24-hour ice service with newly installed S & S ice vending machines.

TENNESSEE

Johnson City, Tenn.—Harmon Ice & Fuel Co., recently took delivery of a Lilly Icizer Model No. 13CE8.

Memphis, Tenn.—A Lilly Icizer Model No. 23CE9 and Feeder have been installed in the plant of Arctic Ice & Fuel Co.

Nashville, Tenn.—Hermitage Ice Co., here has a new Lilly Icizer Model No. 8A5½

TEXAS

Austin, Tex.—Pitts Ice Co., recently installed a Sturdy-Built Ice Vending Station. The unit sells processed ice in bags as well as block ice.

Port Arthur, Tex.—A Lilly Icizer Model No. 8A5½ was recently installed in the plant of the Port Arthur Ice Co., by The Lilly Co., of Memphis, Tenn.

VIRGINIA

Timberville, Va.—The Timberville Co-operative meat packing plant costing $1,500,000 was recently dedicated. The three story building is steel and concrete and has 110,000 sq. ft. of floor space.

Sales and Reorganizations

Inverness, Fla.—A modern meat curing plant and slaughter house was opened in October when Angier Wills took over the management of Brooksville Meat Curing & Slaughter Plant. Wills was former manager of Florida Frozen Foods Products Inc. of Tampa.

Grand Rapids, Mich.—Service Storage Co., a newly-organized firm, has purchased part of the facilities of Kent Storage Co., 69 Front Ave., N. W., for cold, dry and freezing storage, it was recently announced by George A. Payne, secretary. Edward E. Hoekzema of Granville, president of Frost-Pack Distributing Co., is president of the new corporation.

Clyde, N. Y.—Jacob Gennis has purchased the Galen Cold Storage and is accepting fruits and vegetables for storage. Mr. Gennis also operates a wholesale fruit and vegetable business in Utica.

Gladewater, Tex.—The former Kelly Ice Co., 110 East Broadway, is under new ownership, according to announcement made by Prunty Ice Service which has taken over operation of the company.

Hubbard, Tex.—The Hubbard Ice plant has been sold to Bill Edwards, Jr., of Dallas. Glen Shields, also of Dallas, is the local manager.

Fires and Accidents

Lawrence, Mass.—A fire levelled three ice houses of the Forest Lake Ice Co., on West St., recently with a loss of $10,000 and threatened one of the city's most thickly settled residential and industrial sections. The fire started in an old ice house, and spread to the others.

Gladstone, Mich.—Fire of undetermined origin destroyed an old landmark, the Soo Line ice house, located between the railroad depot and the roundhouse. The structure had been unused for about ten or twelve years when the railroad began contracting with Gus Lierman, local iceman, to ice the trains morning and evening.

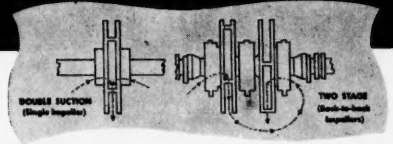
McMinnville, Tenn.—Fire recently destroyed the Depot bottom plant of the McMinnville Ice Co. with an estimated loss of between $5,000 and $10,000.

Icy Item

Perryville, Ark.—W. A. Glenn, owner of the Perry County Ice Co., here has announced that the company's 15-ton capacity plant is being moved to Perry where it will be combined with the plant at that place. New electric hoist is being installed at the Perry plant.

PUMP with BALANCED POWER

AMERICAN Double Suction and Two-Stage Centrifugal Pumps Minimize End-Thrust Wear . . Give Longer Trouble-Free Service



The principle of balanced power . . . the equalization of hydraulic forces . . . engineered into these two outstanding clear liquid pumps, prevents motor power from being *frittered away in costly and useless end-thrust.* Horse power is devoted to the *specific task of pumping!*

Type 4000 Double Suction—Split case, ball bearing design. Enclosed, bronze, double suction impeller . . . all water passages hand finished and exterior surfaces machined. Capacities from 50 to 7000 GPM. Heads from 25 to 250 feet. *Bulletin No. 248.*

Type 4400 Two Stage—Split case, ball bearing design. Passage from first to second stage entirely within casing. Back-to-back, enclosed, single suction, bronze impellers. Capacities from 50 to 1500 GPM. Heads from 50 to 450 feet. *Bulletin 246.*

ENGINEERING SERVICE—Our engineering staff is well qualified to aid industrial and operating engineers in the selection of pumping equipment to meet individual needs.

American Well Works

146 No. Broad, Aurora, Ill. • I. G. Grawoig, President

Pumping, Sewage Treatment, and Water Purification Equipment

WOLF-LINDE

Est. 1880

"THE OLDEST NAME IN REFRIGERATION"

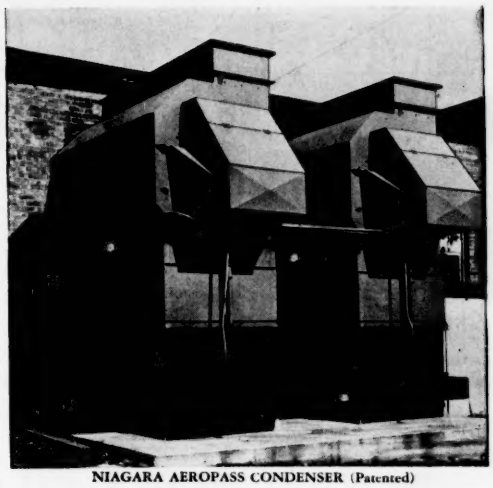
EVAPORATOR PRESSURE CONTROLS

Sizes ¾" to 6" for use with all refrigerants in pressure ranges from 20" vacuum up to 80 p.s.i.

Manufactured and Sold by

DERSCH, GESSWEIN & NEUERT, Inc.

4849 West Grand Avenue Chicago 39, Illinois



NIAGARA AEROPASS CONDENSER (Patented)

Saves half the Engineer's Troubles ...with a Refrigeration Plant

Hundreds of engineers have been interviewed about their experience with the Niagara Aeropass Condenser. In one way or another, they say, "I wouldn't go back to anything else." And their managers, who watch the costs, say, "Best investment we ever made, couldn't operate now, without it."

Niagara Aeropass Condensers have three exclusive features which save trouble and money in running a refrigeration plant:

The "Duo-Pass"— keeps scale and salts from crusting the coils, keeps the condenser always at full capacity.

The "Oilout"— removes oil and dirt from the refrigerant, at the exact point where the oil vapor is condensed and the refrigerant is not.

The "Balanced-Wet-Bulb" control gives automatic operation at the minimum head pressure, saving power cost the year 'round!

In addition, the Niagara Aeropass Condenser saves nearly all your cost of cooling water, quickly bringing back to you the cost of installation. In plants where refrigeration is a production process, owners know that this condenser has reduced their costs.

Write for Bulletin 103.
You can see one of these installations near you.

NIAGARA BLOWER COMPANY

Over 35 Years of Service in Industrial Air Engineering

Dept. IR 405 Lexington Ave., New York 17, N. Y.

District Engineers in Principal Cities

INDUSTRIAL COOLING HEATING • DRYING

NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT

OBITUARY

D. F. Fisher

THE death of D. F. Fisher, since 1930 in charge of research on transportation and storage of fruits and vegetables in the Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, occurred of a heart attack on September 18, 1949. He was 61.

D. F. Fisher

A New Yorker by birth, Mr. Fisher graduated from the Michigan State College in 1912 and received a Master of Horticulture degree from that institution in 1917. He joined the U. S. Bureau of Plant Industry staff in 1912, and the next year was sent to Wenatchee, Wash., where for 17 years he was in charge of the U. S. Fruit Disease Field Laboratory. His work there covered a wide range of fruit production and handling problems, one of the most important being the successful removal of arsenic spray residue from apples. He also rendered conspicuous service in connection with the development of the new generally used method of packing apples in oiled paper to control apple storage scald.

Characteristically Mr. Fisher's interests and service extended beyond his profession. At Wenatchee he served as president of the Rotary Club and as Master of his Masonic Lodge, was a trustee of the Chamber of Commerce and member of the executive council of the Boy Scouts. He was president of the Northwestern Association of Horticulturists, Entomologists, and Plant Pathologists, and a life member of the Washington State Horticultural Society.

In 1930 he was transferred to Washington, D. C. and placed in charge of the Bureau's fruit and vegetable handling, transportation, and storage investigations. Subsequently market disease investigations of fruits and vegetables were added. In the 19 years during which Mr. Fisher has directed these investigations many valuable advances have been made in meeting the problems of maintaining quality and preventing spoilage loss in the marketing of fruits, vegetables, and florists' stocks. Improved equipment has been developed on the basis of principles that have been worked out, new and more effective methods have been devised, and the industries concerned have been aided in many ways.

He combined a broad understanding of the industry problems, a scientific attitude toward their solution and administrative ability of high order. He maintained effective and cordial contacts with transportation officials, shippers, and organizations of growers. During the year preceding his death he had planned and put in operation a much broadened program of investigation under the Research and Marketing Act. He was the author of many scientific publications. The result of studies made under his supervision formed the basis of many articles, prepared by him or one of his associates, published in ICE AND REFRIGERATION.

Mr. Fisher made his home at Takoma Park, Md., a suburb of Washington. Here also he took an important part in community activities. He was an active member of the Takoma Park Presbyterian Church and served on the Board of Trustees for twelve years.

He was a member of the American Society for Horticultural Science, the Botanical Society of Washington, Alpha Zeta national fraternity, Sigma Xi honor society a counselor for the Society of Refrigeration Engineers, and a fellow of the American Association for the Advancement of Science.

He is survived by his widow, Mrs. Alida Dearborn Fisher, a married daughter and two married sons.

Edward M. McChesney

THE death of Edward M. McChesney, for many years in the ice business in Freehold, N. J. occured Wednesday morning, August 17. Mr. McChesney was the first to build an ice plant in Freehold. In 1915 he purchased an ice business and from then until 1925, he maintained two natural ice houses. In 1925 he built an ice and cold storage plant but in 1938 the ice plant was closed and ice was purchased from the Seaboard Ice Co., of Neptune. In 1943 he went out of the retail ice delivery business, turning the ice routes over to the drivers who purchased their ice from him. The plant continued to provide cold storage space for fruits, potatoes and other vegetables.

FREDERICK MEYER, 88, known in the refrigeration industry as a builder of refrigerated truck bodies, died September 16 in General Hospital, Buffalo, N. Y. Until the last few months he was president of the Meyer Body Co. Several years ago he designed and patented the Meyer anti-drip ice cream wagon with copper bottom reinforced with steel which had a wide use among ice cream makers. Later he designed refrigeration bodies for perishable food trucks.

CLYDE HILDRETH, mayor of Sausilto, Calif., and well-known Bay area busness leader died September 21 at the age of 59. Mr. Hildreth was secretary-treasurer and director of the San Joaquin Cold Storage Co., and The Lawrence Warehouse Co. of San Francisco and took an active part in other business interests.

STEARNS AGAR, 79, one of the founders of the Agar Packing & Provision Corp., Chicago, died September 30 at his home in Wilmette. He is survived by his widow, a daughter and two sons.

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, and March 3, 1933, of ICE AND REFRIGERATION, published monthly at 435 North Waller Ave., Chicago 44, Ill., for October, 1949.

State of Illinois, Cook County, ss.: — Before me a Notary Public, in and for the State and County aforesaid, personally appeared H. T. McDermott, who, having been duly sworn according to law, deposes and says that he is the Editor and Publisher of ICE AND REFRIGERATION, and that the following is to the best of his knowledge and belief, a true statement of the ownership management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, and March 3, 1933, embodied in section 433 Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are: Publisher, Nickerson & Collins Company, Chicago, Ill.; Editor, H. T. McDermott, Oak Park, Ill.; Managing Editor, E. R. Curry, Chicago, Ill.; Business Manager, L. R. Townsley, Chicago, Ill.

2. That the owners are: Nickerson & Collins Co., Chicago, Ill.; H. T. McDermott, Oak Park, Ill.; H. T. Curtis, Chicago, Ill.; L. R. Townsley, Chicago, Ill.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: There are no bondholders, mortgagees, or other security holders.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, as they appear upon the books of the company but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which the stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

(Signed) H. T. McDermott, Editor and Publisher.

Sworn and subscribed before me this 13th day of September, 1949, Helen G. Smith, notary public. [Seal.] (My commission expires June 24, 1952).

STURDY-BUILT ICE VENDING STATIONS

Cut Costs.. Cure "Off-Season" Slump

Surveys prove automatic ice vending captures 27% "plus" business from occasional users.

According to recent surveys 27% of the ice sold through STURDY-BUILT Refrigerated Ice Vending Stations is purchased by occasional ice users. This represents a *plus* market hitherto untapped by the ice industry.

The same surveys reveal that 45% of the sales made by STURDY-BUILT refrigerated ice vending stations are made between the hours of 4:00 and 8:00 P. M. . . . strictly "after hour" business lost entirely to the ice manufacturer or distributor who fails to provide dependable 24 hour automatic service.

Progressive ice distributors throughout the nation plan to maintain volume . . . even through the "off season" . . . with STURDY-BUILT refrigerated Ice Vending Stations. They plan to capture the 27% volume, which they have never enjoyed, increasing winter sales by at least that much. They see in automatic ice vending an opportunity to cut excessive distribution costs and stretch profit margins by offering customers dependable "round the clock" service.

Visit us in Booths 14 and 15 at the National Convention

REFRIGERATED STURDY-BUILT ICE VENDING STATIONS

F. B. DICKINSON & CO.
Highland Park Station
Des Moines, Iowa

S&S ICE VENDING MACHINES

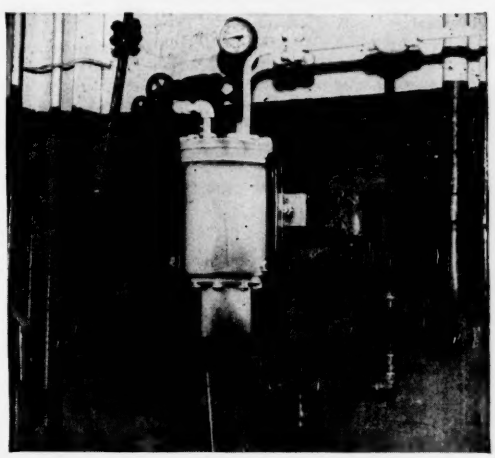
S & S VENDING MACHINE CO.
670 Lincoln Avenue
San Jose, California

IF YOUR REFRIGERATION HEAD PRESSURE IS *UP* SO ARE YOUR COSTS!

IT PAYS to KNOW if the condenser pressure in your refrigerating system is higher than it should be because every 4 lbs. excess pressure raises power costs 2% and reduces capacity 1%. (Excess pressures of 15 to 50 lbs. are common.) In 9 out of 10 such cases air and other non-condensables in the system are responsible for this condition.

Ordinary purging methods seldom, if ever, get rid of all the air; they invariably waste a lot of expensive refrigerant and take a lot of time and trouble.

The ARMSTRONG PURGER has answered this problem for hundreds of plants, most of whom report their unit has paid for itself in from 30 days to six months through power, refrigerant and labor-savings, with increased system capacity as a bonus. The Armstrong Purger requires little attention; it gets all of the air out of the system with minimum refrigerant waste. This high quality unit has a forged steel body and stainless steel mechanism for safety and reliability. The price is within easy reach of any plant. Complete satisfaction is unconditionally guaranteed. Let an Armstrong Representative help you to lower refrigeration costs. Write today.



*HOW TO TELL if purging is needed is fully explained in The ARMSTRONG PURGER BULLETIN which also shows how the Purger operates and gives prices and data. SEND FOR A COPY.

ARMSTRONG MACHINE WORKS
860 MAPLE ST. THREE RIVERS, MICHIGAN

NEW AND IMPROVED EQUIPMENT

MACHINERY-APPLIANCES-PROCESSES

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

New Cold Pipe Insulation

A NEW light weight pipe and vessel insulation, known as K-shield, has been developed by Robinson Industries, Coleman, Mich. The development is especially suited for cold pipe insulation, and application consists of a simple covering procedure. Although the product was not introduced until March of this year, the nature of the development and the success of the company to date indicate ready acceptance of the newcomer.

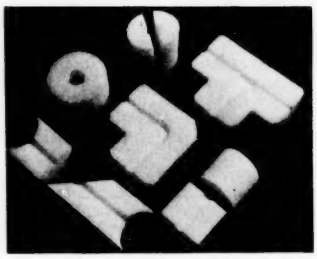


Photo shows new K-Shield cold pipe insulation in various cross sections.

K-shield is made of Styrofoam, an expanded plastic containing thousands of minute closed-wall cells. The efficiency of any insulation material depends primarily upon the number of small dead air spaces that it contains. "For this reason," states Fred A. Robinson, President of Robinson Industries, "we found Styrofoam to be an ideal material for this particular application."

Although K-shield is airy looking and extremely light (weighing approximately 1¼ to 1½ lbs. per cu. ft.), it is a highly workable rigid material which is its own moisture barrier. High moisture-vapor resistance and resistance to mold growth, rot and decay are other outstanding properties.

This new type insulation presents no problems in field installation since it can be cut and fitted rapidly with ordinary tools. Compared with other types of insulating materials, no vapor seal coating is necessary.

To date, it is being used in cold storage units, chemical processing plants, oil refineries and in special applications on pipe lines where temperatures range from 175 to minus 250 F. Test applications of three years standing show high efficiency and little or no maintenance, the manufacturer reports.

It is manufactured for all standard pipes and fittings and custom fabricated to specifications for insulating process equipment such as tanks, pumps, accumulators and other non-standard items.

Niagara Blower Manufactures Dehumidification Unit Under Research Patent

J. W. BARKER, President of Research Corporation, announces that the Niagara Blower Company has been awarded the license to manufacture dehumidifying and air conditioning equipment under its series of patents covering the removal of moisture from air or other gases by the use of a hygroscopic liquid.

In the method developed by Research Corporation's scientists, air is dehumidified by contact with a liquid spray which absorbs the moisture from the air stream passing through the equipment. The dehumidifying liquid, as it is diluted by the airborne moisture, is automatically re-concentrated in apparatus which evaporates the moisture and discharges it outdoors. This provides a continuous process which promises improvement in the making and handling of many products and materials that pick up unwanted moisture.

Research Corporation is a unique foundation whose net earnings, from licensing activities and sale of Cottrell precipitators, are contributed to scientific and technical institutions and societies for the support of scientific investigation and research.

Niagara Blower Company, the licensee under Research Corporation patents, has been engaged in the manufacture of air engineering equipment since 1919. Its air conditioning and heat transfer apparatus is widely used in industry. New equipment to make the liquid absorbent dehumidifying method commercially available is now being designed. Offices are located in the Chrysler Building, New York 17, N. Y. and its plant at Buffalo, N. Y.

New Cleaning Agent

A DETERGENT and wetting agent for the removal of fruit stains, blood, fatty particles and other proteinaceous material at temperatures below zero is announced by Monsanto Chemical Co. The product is Santomerse No. 1, a synthetic organic detergent. Alone, or in combination with "builders" it has been used as a general purpose cleaning agent for a variety of industrial and household applications. Stable in acid and alkaline solutions, it functions in either hard or soft water, and in addition markedly retards the growth of mold and bacteria. Its ability to clean even in salt water led to its adoption by the Army and Navy during the war.

It is this ability to function in salt water that makes it an especially effective locker plant cleaner. A brine solution containing 2.5 pounds of salt and 2 ounces of Santomerse No. 1 per gallon, it is claimed, will clean the interiors of individual food lockers at temperatures as low as minus 4 F. This eliminates the need for defrosting while the germicidal and deodorant action of the solution leaves lockers fresh and sweet.

Marlo Announces "Lektor-Tektor"

RESEARCH by engineers of Marlo Coil Company of St. Louis into the problem of electro-chemical corrosion of sump tanks has resulted in the development of the Marlo "Lekto-Tektor" as the first successful anticorrosion installation for tanks of evaporative condensers and cooling towers.

Cut-away illustration of evaporative condenser showing "Lektro-Tektor" in sump tank.

Constant electrolytic corrosion of the zinc galvanizing on sump tanks is caused by the flow of electric current from anode to cathode areas. This continuous attack on the weaker areas of tanks has long been a problem that led to pitting of the galvanizing, bare steel spots and early tank failure.

To effectively combat this corrosion, the Marlo unit, according to the manufacturer, successfully transfers this constant corrosive attack from the metal of the tank to the "sacrificial" "Lektro-Tektor" rod, which is installed in the sump tanks slightly below water level. Electrons produced by the "Lektro-Tektor" flow to the walls of the tank to reduce harmless the dissolved oxygen and other corrosive elements. Two supplemental protective factors are added by the "Lektro-Tektor" to prolong sump tank life. A protective film is formed on the tank walls as the continuous flow of current results in deposits of insoluble lime salts on the walls. Secondly, the tank water is chemically conditioned to render it less aggressive. The magnesium introduced into the water from the "Lektro-Tektor" strengthens the protective film.

The Marlo Coil Company has announced that the complete line of evaporative condensers and cooling towers will include the new "Lektro-Tektors" as standard equipment. It can also be installed in sump tanks of Marlo units now in operation.

Additional information on this new equipment may be obtained by writing The Marlo Coil Company, St. Louis, Mo.

New Ice Crusher Sizer Units

TWO ice crusher sizer units incorporating a feature that eliminates vibration on the frame of the shaker sizer have been placed on the market by the Bateman Foundry and Machine Co., of Mineral Wells, Texas.

The design makes use of three screens, which run on roller bearings and in counter-balancing action that means minimum stress and strain. According to the manufacturer this assures years of additional service and economy. Screen openings for sizing ice are 1½, ¾ and ⅜ inch.

One of the units using the newly designed three-screen element is the automatic loader shaker sizer. It can be operated by one man, who will have ample time to keep 50 lb. blocks of ice in the loader magazine and handle bagging of crushed ice while the machine is in operation. It will process 175 lbs. of ice per minute.

The other unit is the bin shaker sizer, which is designed for manual loading. This shaker sizer, which also can be operated by one man, discharges properly sized ice into three bins.

Both units, as well as all other Bateman ice processing units, now are being galvanized by the duPont Bright Zinc Electro process without extra cost to the buyer, it was announced.

AS LITTLE AS 8¢ Per Day--

THE POWER COST FOR THE

MOTO-TRUC
MOTORIZED
BATTERY OPERATED
WALKIE TRUCK

MOTO-TELESCOPIC HI-LIFT TRUCK 3,000 lbs. capacity. 80" lift, 2,000 lbs., up to 144" lift, fully extended. Patented articulating hinged spring unit holds drive wheel down for better traction.

Write for specifications.

At so little cost - - - such big results:

MOTO-TRUCS OPERATE IN LESS AISLE SPACE. They are up to 15" shorter (in overall length) than other motorized hand trucks, due to more compact motor unit, and they allow more space for storage.

MOTO-TRUCS REDUCE TRUCKER FATIGUE, INCREASE EFFICIENCY, due to simple and comfortable roller type handle, giving two speeds forward and two speeds reverse by an easy turn of the wrist. Push buttons in the ends of handle control the hydraulic lift.

MOTO-TRUCS PROVIDE GREATER SAFETY. Dead man controls and other safety features provide real protection for both operator and load.

MOTO-TRUCS ARE FAMOUS FOR LOW MAINTENANCE COST. The 12-volt interchangeable motor unit is exceptionally easy to inspect and service.

WRITE FOR BULLETIN NO. 49

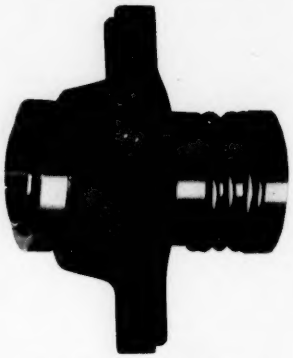
The MOTO-TRUC Co.
1953 E. 59th Street
CLEVELAND 3, OHIO.
ORIGINATORS OF
MOTORIZED HAND TRUCKS

New Mechanical Shaft Seal

FOR installation on equipment, moving or transferring liquids, which requires a positive shaft seal, as well as for replacement of conventional stuffing boxes where packing has proved unsatisfactory, Peerless Pump Division of the Food Machinery and Chemical Corp. has developed a new mecanical shaft seal to provide as perfect a mechanical means for prevention of leaks around a rotating shaft as is possible.

These seals are available in three general classifications, — standard, abrasive-resistant and special. As the classifications imply, the standard shaft seal is suited for use when a limited amount of abrasive material is present in the liquid being pumped or transferred. The abrasive-resistant seal can be applied to all abrasive liquid conditions. The special is constructed of special materials to meet unusual liquid or fluid conditions.

The complete mechanical shaft seal is of Peerless' own design and manufacture and is of the cartridge type. Unit construction makes for easy replacement and maintenance. All liquids can be sealed, the type of seal to be applied depends on the abrasive qualities of the liquid, the corrosion problems encountered and the relative lubricating qualities of the liquid to be handled. Liquids such as water, gasoline, alcohol, hydraulic fluids, ammonia, brines, as well as concentrated or boiling acids and salts can be successfully sealed.



New Mechanical Shaft Seal

The maximum pressure recommended for these seals is 400 psi. Higher pressures require a special balance check. Liquid temperature handled can be up to 250 F with no water cooling; with water cooled stuffing boxes, liquid temperatures up to 300 F can be handled. Seals can be furnished for application to all rotating shafts ½ to 3 in. diam.

New Bonding Products

TWO new metallurgical products "Flawmaster" and "Bonding Agent R 313" have been developed by Western Sealant, Inc., manufacturers of processes employing vacuum and pressure for the bonding of dissimilar and similar materials and the method of preventing porosity in metal parts to be pressure tight. These new products possess the properties of the original processes and permit for the first time an easy manual application without the need of intricate machinery.

"Flawmaster" is a thermosetting compound used to reclaim metal parts and castings otherwise rejected for surface flaws, sand pitting, foundry gas holes, faulty machine surfaces, taps and many other flaws, matching the metal to which it is manually applied. It is claimed to be machineable, chemically inert, and is resistant to a wide range of temperatures.

"Bonding Agent R-313" is a medium for manually bonding dissimilar and similar materials such as glass, plastics, neoprene, leather goods, etc., to metals and ferrous to non-ferrous metals, etc., and meets industrial requirements for pressure, chemical and temperature resistance.

One advantage offered by these two products exists in the simplicity of application at a nominal cost.

REX refrigeration equipment

protects you against high power costs

increases tonnage of your refrigeration system

From the smallest to the largest refrigeration system, Rex Equipment brings new economy that means dollars and cents savings in power and operating costs.

Losses in efficiency in refrigeration systems can be attributed to one or more of the following:

- NON-CONDENSABLE AND FOUL GASES
  Cause excess head pressure and reduced capacities.
- WATER AND OIL IN THE SYSTEM
  Lowers capacity by raising the boiling point of liquid refrigerant.
- DIRTY CONDENSERS
  Scale raises condensing pressure and lowers capacity.
- SUPER-HEATED REFRIGERANT DISCHARGE GAS
  Should be removed before entering the condenser.

Rex Equipment eliminates losses from waste of power in compressors and condensing or evaporator units.

- REX AIR PURGER
  Removes all non-condensable gases. Holds down head pressure.
- REX EXTRACTOR
  Removes compressor oil and water vapors in the discharge line.
- REX SPECIAL TUBE CLEANING EQUIPMENT
  Electrically driven. Cuts cleaning time to ¼ of hand scraping.
- REX SUPER-HEAT EXTRACTORS
  Removes super-heat, lowering the discharge pressure.

Write us today for bulletins or consult your distributor.

REX ENGINEERING & SALES CO.
Oklahoma City, Oklahoma
BOX 5141

it's even COLD enough for me

WITH THAT PURE AND DRY

ARMOUR'S ANHYDROUS AMMONIA

Armour's Anhydrous Ammonia is pure and dry . . . free of moisture and non-condensable gases. And to insure trouble-free operations, every cylinder is tested and checked before shipping to give positive assurance of fine quality.

Remember, too, that fast shipment is an Armour byword. In fact, many customers receive their Armour's Anhydrous Ammonia the day it is ordered. 65 conveniently-located stock points are your assurance of receiving prompt shipment of Armour's Anhydrous Ammonia in either 50, 100 or 150 pound cylinders where you want it, when you want it and fast.

Please return empty cylinders!

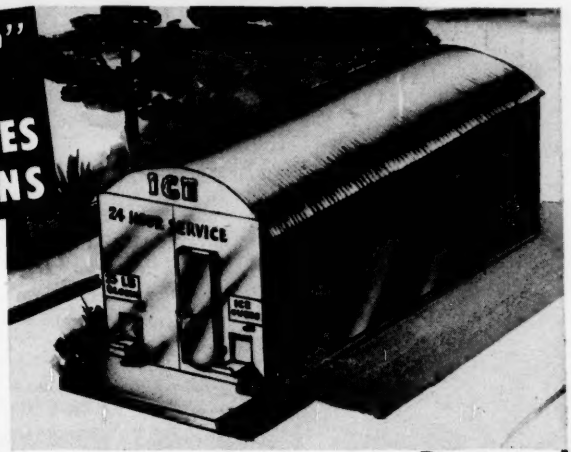
ARMOUR *Ammonia Division*

Armour and Company
1355 West 31st Street • Chicago 9, Illinois
North Bergen, New Jersey

Your "Silent Salesman"

RECO

ICE VENDING MACHINES & VENDING STATIONS



'Round the Clock *Ice Service* means 'Round the Clock *Profits!*

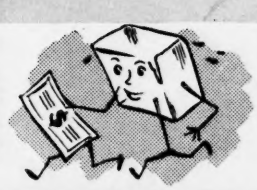
Block, cube, or crushed ice is available 24 hours a day . . . morning, noon and night . . . in these RECO coin operated Ice Vending Stations. They're completely automatic . . . handle retail sales without a hitch to give you PLUS profits!

There are eight models of RECO Silent Salesman Ice Vending Machines, suitable for supplying 25 or 50 pound ice blocks, or 10, 25 or 50 pound bags of sized ice and/or cubes. They are furnished complete with sturdy chute and coin mechanism. The conveyor is pusher type, which prevents jamming due to freezing of block. The coin mechanism is slug-rejector model, designed to receive various combinations of coins, and signal when machine is empty.

CAPTURES EVERY SALE!

A Reco Ice Vending Station is your after-hour partner. It will take care of after-hour customers and give you added income. What's more, Reco Ice Vending Stations will amortize their cost in a short space of time. They are simple to erect with refrigerating machinery ready to plug in and operate. Made by America's largest manufacturer of Sectional Freeze Coolers.

Write for full particulars.



(REFRIGERATION ENGINEERING CORP.)

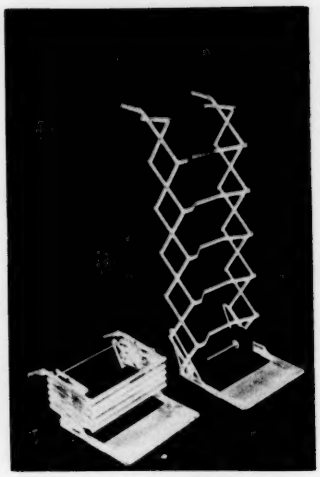
RECO PRODUCTS DIVISION
2020 NAUDAIN STREET PHILA. 46, PENNA

New Fold Away Hand Truck

A FOLD-A-Way hand truck which pulls open like an accordion to its full height of 42 inches with an easy lifting motion, has been introduced by Business Equipment Specialists of New York. Especially designed to take the strain out of moving, the Fold-A-Way can carry up to 700 pounds though it weighs only 25 pounds itself.

Particularly practical where space is a problem, the Fold-A-Way goes out of sight under counters, seats of trucks, luggage compartments, shelves, etc. It may also be found useful in refrigerated warehouses. When a number of hand trucks are needed, the Fold-A-Ways can be stacked so that 10 trucks can be stored in the space formerly required for two of the rigid type. Two notable features of the Fold-A-Way are the glider bar which makes taking a load up or down stairs as easy as rolling along level ground, and the rubber wheels which are placed, not outside the truck sides but inside the frame to eliminate the danger of catching passing objects.

Available in two models, straight back for most packages, and round back for barrels and kegs, but can also be used for straight packages.



New Fold-Away Hand Truck

Truck is all steel construction with heavy duty oil-less bearing wheels made of rubber.

Penguin Automatic Ice Pick Vendor

THE Towal Manufacturing Company, Inc., Mt. Vernon, Ill., manufacturers of automatic ice vending

Penguin "Pick Pocket" Ice Vendor

CONTINUOUS PERFORMANCE

5 to 20% Increase in CAPACITY

Up to 25% Saving in power cost

Safe and Reliable Operation

One Machine Usually Does the Work of Two

after installing

J. H. H. VOSS VALVES

REG. U.S. PAT. OFF.

in your COMPRESSORS

We will be glad to submit estimates if you will send us the name, bore, stroke and speed of your air, gas or ammonia compressors of any type or size.

READ WHAT ONE MEAT PACKER SAYS—

"The set of VOSS VALVES, which we installed in the 200 ton motor-driven compressor, enabling us to speed it up 20%, are working satisfactorily and have enabled us to secure additional tonnage, without any other changes."

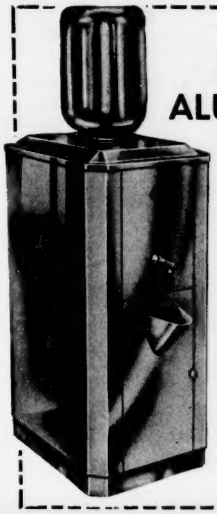
Name of meat packer and copy of letter will be sent on request

Dependable service during your peak season... without any shutdown due to valve trouble... carrying full capacity rated loads of your equipment... with no additional expense for added refrigeration or ice packing... when you install trouble-free VOSS VALVES.

J. H. H. VOSS CO., Inc. 785 East 144th Street NEW YORK 54, N. Y.

Sanitary Equipment Manufacturing Co., Inc.

21ST & WALNUT STS. ST. LOUIS 3, MISSOURI



NOW!
ALUMINIZED TOP
PREVENTS WATER STAIN AND SPOTS... *BE SURE TO SEE THE COMPLETE ICE WATER COOLER LINE*—SEMCO BOOTH

SEMCO

N.A.I.I. CONVENTION
Hotel Commodore, New York, Nov. 15 - 18

MODEL B-150 D
Bottle type water cooler. Natural satin aluminum finish. Chrome-like finish top. 6 qt. stainless steel cold water reservoir. No water connections needed.

Ice Water Coolers—a model for every purpose—designed for offices, restaurants, hotels, hospitals, institutions, schools, factories.

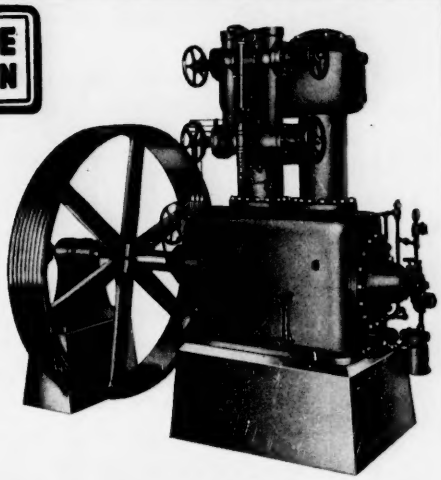
MODEL TBU-175
All aluminum. 75 lb. ice cap. 50 ft. copper coil. 17⅛ x 22 x 39½. Rear outlet and inlet water connections for easy installation.

ALUMINUM: WATER COOLERS—RESTAURANT EQUIPMENT—SHOE SHELVING

Sterling DEPENDABLE REFRIGERATION

WISE OPERATORS ARE PLANNING NOW FOR THE COMING SEASON

You, too, can place your order now for any of the wide range of STERLING compressor sizes. To provide for that additional capacity in your enlarged facilities or altered plant lay-out, look into the STERLING line. Built with advanced operating design features for efficiency and economy, rugged in the selection of materials for endurance, STERLING ammonia compressors are the product of more than fifty years of "know how" in the manufacturing of quality refrigeration equipment.



See your nearest STERLING distributor or write the factory for information.

REYNOLDS MANUFACTURING CO.
SPRINGFIELD · · · MISSOURI.

Through years of sincere effort by our employees, the slogan
"STERLING DEPENDABLE REFRIGERATION"
is more than a slogan—it's a FACT.

machines and refrigerated ice stations, announces the addition of a new product called the Penguin "Pick-Pocket" to their line of ice plant equipment.

The Penguin "Pick-Pocket" is an automatic, mechanically-operated ice pick vending machine. It is constructed of heavy, rust-proof sheet aluminum-copper alloy and has a trouble-free coin slide for positive operation. It is designed to sell picks to ice customers, and it can be attached to automatic ice vending stations, ice plant docks and delivery trucks. The ice picks are vended by direct, mechanical operation, and the machine requires no electrical connections.

MANUFACTURERS' NEWS

Snyder Joins Santa Fe Tank & Tower Co.

DR. N. W. Snyder, Assistant Professor of Mechanical Engineering at the University of California, has joined the staff of Santa Fe Tank and Tower Company, Los Angeles, as chief technical consultant. This announcement came as a prelude to extensive plans for vigorous cooling tower research and development. Dr. Snyder will work in conjunction with L. Obert and A. M. Kuehmsted, veteran members of the Santa Fe engineering staff.

In addition to extensive research on government war projects, Dr. Snyder has conducted numerous experiments on thermal radiation and heat transfer. A major cooling tower project under the direction of Prof. Boelter, placed him in charge of research and experimentation. He has been in charge of an important cooling tower project sponsored by the American Society of Heating and Ventilating Engineers at the University of California.

Dr. N. W. Snyder

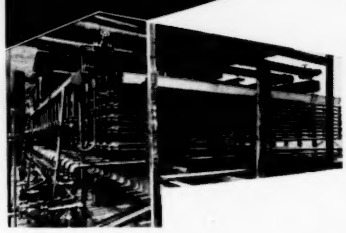
As an authority on problems of cooling and heat transfer, Dr. Snyder will project many of his research findings into a new program planned by the Santa Fe Tank and Tower Company. He is a member of ASME and AIChE.

United Ice Supply Adds to Line

IN LINE with offering the ice industry a more complete line of equipment, the United Ice Supply Co. now is manufacturing the "Ben Special" Needle Point Ice Picks and replacement blades. Scarcity of these blades plus the large demand for them, according to Oliver Benjamin, president, has made it impossible to offer this high quality pick to the entire industry before this time. Now that the blades are available, United Ice Supply is entering into full scale production to assure best possible delivery for the coming season. A sample "Ben Special" ice pick is offered for trial on request. They are fully guaranteed and their quality has been proven by many years of use.

United Ice is active also in supplying a number of other items to the ice industry including ice delivery bags, harvesting machinery and ice chippers.

CONTROL SCALE AND CORROSION in Refrigerating Equipment



Use Wright Water-Conditioning Chemicals in refrigerating and air-conditioning equipment—wherever water is used—to control scale, corrosion and bacteria. You'll be assured of increased operating efficiency, reduced maintenance costs and long, trouble-free performance.

FIELD ENGINEERING SERVICE—Wright Field Engineers are located in principal cities throughout the country to help with your scale and corrosion problems. Call or write us today.

Wright CHEMICALS

WRIGHT CHEMICAL CORPORATION

Specializing in Water Conditioning

GENERAL OFFICES AND LABORATORY: 633 West Lake Street, Chicago 6, Illinois

Offices in Principal Cities

SOLE DISTRIBUTOR OF NELSON CHEMICAL PROPORTIONING PUMPS

REPAIR CEMENT

YOU CAN PERMANENTLY REPAIR AND WATERPROOF BREAKS, CRACKS AND HOLES IN STONE, CONCRETE, BRICK AND TILE.

COMCO READY-MIXED REPAIR CEMENT WILL DO THE JOB

Simply add water only and this cement becomes as hard as iron and sticks permanently to all concrete surfaces. It will not shrink. Comco Cement is waterproof, wearproof, dustproof and oilproof, and will withstand acid and alkali, producing an indestructible floor.

Comco Cement will withstand foot traffic after it has set 25 minutes. After 8 hours it will stand up under heavy-duty trucking. Comco Ready-Mixed Cement is chemically perfect, not just another flooring compound. It is guaranteed to stand up under all conditions, no matter how severe. Comco Cement will permanently line and waterproof hot and cold water tanks.

When ordering, specify Comco Resurfacing Cement for large areas, and state whether it is to be used in a refrigerated or hot room.

1 bag (100 lbs.) covers approximately 44 sq. ft. ¼-in. thick, the required thickness for heavy-duty trucking. 100-lb. bag.....$11.00

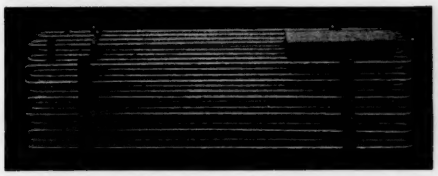
All prices F.O.B. Factory, Chicago

CONCRETE MATERIALS CORPORATION
318-320 W. HUBBARD ST., CHICAGO 10, ILLINOIS

QUALITY COILS FOR *ALL* APPLICATIONS

WELDED HEADERS, PIPE BENDS AND AMMONIA RECEIVERS

Whether your next job be for a single bend, or coil or complete piping system, Chicago Nipple can supply your requirements. Experienced workmen, practical engineers, and modern equipment reflect the quality of our products.



Coils are of selected ammonia pipe—all joints are electrically welded—checked under water with an air pressure of 300 pounds to guarantee tightness.

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CHICAGO NIPPLE MFG. CO.
1997 Clybourn Ave., Chicago 14, Ill.

PRINCIPLES of REFRIGERATION

The Book for:

- ERECTING ENGINEERS
- OPERATING ENGINEERS
- CONSULTING ENGINEERS
- SALES ENGINEERS
- CONTRACTORS
- ARCHITECTS
- STUDENTS
- PLANT OWNERS

PRINCIPLES OF REFRIGERATION, 3rd Edition (1947) revised by Wm. H. Motz, provides information and data for the practicing refrigeration engineer. Of special interest to erecting and operating refrigerating engineers, refrigeration machinery sales engineers, persons employed in building refrigerating machinery and those employed in ice making, cold storage plants or other establishments equipped with refrigerating machinery. Contains information that the refrigerating engineer should know in order that he may have complete and up-to-date knowledge.

Written in every day language and as free as possible from higher mathematics. The theoretical and fundamental operating principles are given attention first—followed by numerous practical considerations and the application of principles to the economic production of ice and refrigeration for various purposes.

672 Pages—215 Illustrations—9 Folded in charts—6 Working charts in Cover Pocket. Substantially bound. **$8.00**

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433 N. Waller Ave. Chicago 44, Illinois

A SIZE AND A TYPE FOR EVERY APCO TURBINE-TYPE LIQUIDS HANDLING JOB

WATER SUPPLY
CIRCULATING
NON-CLOG
DRAINAGE
IRRIGATION
BOILER FEED
REFRIGERATION
SEWAGE
ETC.

PUMPS "by Aurora" are the product of EXCLUSIVE BUILDERS of FINE *pumps*

MUNICIPAL
FARM & HOME
REFINERY
DISTILLERY
CORROSIVES
BOOSTER
COND. RETURN
ETC.

Write for CONDENSED CATALOG "M"

AURORA CENTRIFUGAL

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA Always PUMPS

AURORA PUMP COMPANY

Taylor Instrument Advances Reynolds

AN announcement by Raymond E. Olson, general sales manager of Taylor Instrument Companies states that Robert E. Reynolds has been transferred from the San Francisco office to Chicago where he will become assistant manager. He will assist L. Lawrence Forward who has managed the company's Chicago operations since the end of the last war. He joined the company in 1940 upon graduation from Leland Stanford University as a chemical engineer. He served overseas from 1943 to 1945 as a First Lieutenant in the Marine Corps. His chief responsibility in the Chicago Office will be to head up the sale of industrial instruments and supervise the constantly growing sales staff in that area.

Marlo Announces Price Reductions

EFFECTIVE September 1, Marlo Coil Company has announced price reductions of approximately 20 per cent on several items. The items reduced are evaporative condensers for ammonia and the FUA-FUB industrial cooling units for ammonia. This price reduction was in line with the recent reductions in the price of hot galvanizing, and in accordance with Marlo's previously established policies, according to the company, this price reduction is being passed on to the trade.

BAKER

Those who know specify

BAKER VALVES AND FITTINGS FOR AMMONIA

Cutaway view of ½" Globe Valve with screw ends and screw bonnet reveals many Baker quality features. Notice the heavy body cross-section, the large rising stem with positive back seating; the extra heavy disc, swivel mounted on stem and face-filled for uniformly tight closure.

Baker Valves conform to standard face-to-face dimensions, and are available in screw and flange ends with screw or bolted bonnets, in globe and angle types in a wide range of sizes. Complete lines for Ammonia and Freon. Also Expansion Valves, Relief Valves, Purge and Needle Valves, Liquid Gauge assemblies and fittings of every description.

We believe so thoroughly in the high quality and dependability of Baker Valves and Fittings that we take our own medicine. We specify them for all Baker Compressors and Condensing Units! You, too, can be certain that these products, backed by 44 years experience, will give you long service and satisfactory operation in all refrigeration applications.

Available through Baker Distributors throughout the United States and in 75 Foreign Countries.

BAKER REFRIGERATION CORPORATION

General Offices: South Windham, Maine

Factories at South Windham, Maine, and Omaha, Nebraska

Moss New Sales Manager for Madden

THE Madden Brass Products Co., recently organized to take over the Electrimatic line of refrigeration fittings has appointed F. H. Moss as sales manager. Mr. Moss knows his products thoroughly as he was assistant to M. B. Madden, who heads up the new b.M.p. line. Both Mr. Madden and Mr. Moss are well known to the trade as they were key men with Electrimatic Division of the Simonize Company.

F. H. Moss

The new line will include forged flare nuts and fitttings, charging lines, strainers and driers as well as a line of fittings and accessories specifically marketed for the LP-Gas industry.

Penguin Announces New Distributors

ROBERT E. Towal, president of the Towal Manufacturing Company, Inc., which manufactures Penguin ice vending equipment, announces the recent addition of The Lilly Company of Memphis, Tenn., to the sales organization of his company as distributor for the states of Tennessee, Arkansas, Mississippi and Louisiana.

The Central Engineering Company of Dallas, Texas has been appointed as distributor for the Penguin line of ice equipment in the state of Texas. The Lilly Company and The Central Engineering Co., will sell the complete line of Penguin automatic ice vending machines and refrigerated ice stations.

MODEL C-2
Approved by Underwriters' Laboratories, Inc.

CONTROL ODORS AND MOLD

GENERAL OZONE *Air Clear* EQUIPMENT OFFERS ADEQUATE PROTECTION FROM MOLD AND ODORS

Use *Air Clear* wherever food commodities are stored to reduce spoilage. General Ozone has a complete line of modern ozonizing equipment plus full service facilities for both old and new types. Write us today for further information.

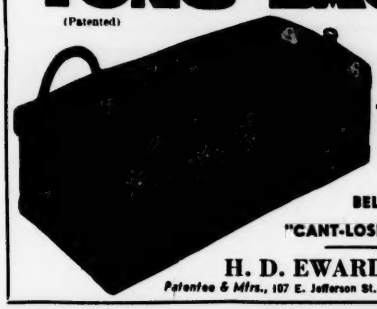
GENERAL OZONE CORPORATION

17 West Sixtieth St., New York 23, N. Y. 1455 West Congress St., Chicago 7, Ill.

Manufacturers of ozone generating equipment for cold storage ● warehouses refrigerated cars ● walk-in coolers ● air recirculating systems.

TONG-BAGS

(Patented)



CUBE & CRUSHED ICE BAGS

"COOL-RITE" MILK CASE BAGS

"SNUG-FIT" BELT PURSES

"CANT-LOSE" WALLETS

H. D. EWARD CO.

Patentee & Mfrs., 107 E. Jefferson St., Ft. Wayne 2, Ind.

THE FAN THAT BLOWS *upward*

Reco

REFRIGERATOR FAN

Stored products must have a constant supply of fresh, re-vitalized air to keep in perfect condition. That's what the RECO provides. It reduces refrigeration costs, too.

REYNOLDS ELECTRIC COMPANY

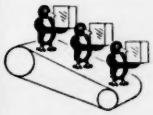
EST. 1900

3060 River Rd. River Grove, Ill.

*Reg. U. S. Pat. Off.

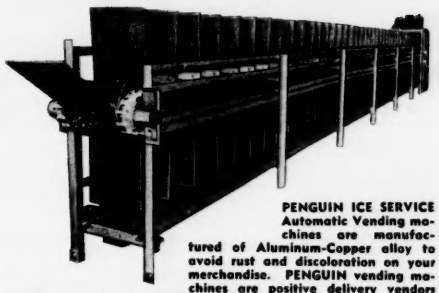
FREE

Write for copy of Bulletin No. 241. It's chock full of valuable limits on refrigerator maintenance.



Penguin ICE SERVICE

The PENGUIN WAYSIDE Automatic, Refrigerated Ice Station at less than $2000.00, f.o.b. plant, is engineered to meet the Ice Manufacturer's and Distributor's dream—ideal for filling station, country store, resort, and WAYSIDE locations . . .



PENGUIN ICE SERVICE Automatic Vending machines are manufactured of Aluminum-Copper alloy to avoid rust and discoloration on your merchandise. PENGUIN vending machines are positive delivery vendors not depending on the uncertainty of weight and gravity to satisfy your customers idea of service.

Write for Descriptive Circulars and Prices

TOWAL MANUFACTURING CO., INC.

MT. VERNON ILLINOIS, U.S.A.

YES! IT'S BOOTH No.2 FOR YOU and UNITED WE HOPE YOU WILL VISIT US

"BEN SPECIAL Quality Ice Picks"
Plain — Printed —
Replacement Blades
Nationally known for the best

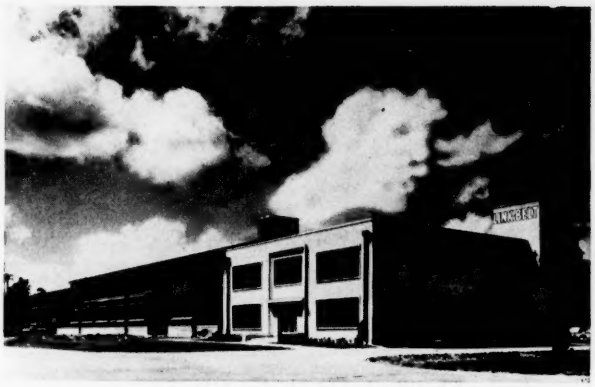
UNITED ICE & OIL SUPPLY CO. **55 Beverly St., Boston 14, Mass.**

Link Belt Opens New Houston Plant

LINK-BELT Company, well-known manufacturer of chains, elevators, conveyors, and power transmitting machinery, announces that its modern new manufacturing plant built on a 10-acre plot of ground at 3203 South Wayside in Houston, Texas, was formally opened September 27, 1949. On this date, the Link-Belt Board of Directors held their quarterly meeting at the Shamrock Hotel, whereupon they proceeded to the plant to meet prominent men of Houston and vicinity and join them in an inspection of the new operations.

The new Houston plant, comprising approximately 45,000 sq. ft. of floor space, has been built to better serve the ever-expanding industries of the Great Southwest, either direct or through official distributors, of which the southwestern division of the company has a great many, scattered all over Texas, Oklahoma, Arkansas and Louisiana. It includes a one-story all steel factory building with three bays and a two-story office section in front.

Allan Craig, formerly located at the Link-Belt plant in Atlanta, is general manager of the company's Southwestern Division, with headquarters at the new Houston plant.



New Link Belt Plant in Houston, Tex.

CATALOGS AND BULLETINS

Vilter Issues New Ice Making Bulletin

BECAUSE The Vilter Manufacturing Company of Milwaukee firmly believes that the ice industry is still the robust sire of an increasing family of ice manufacturing companies, the firm has recently published a new bulletin describing its refrigeration machinery and equipment for can ice plants.

Front cover of new Vilter Bulletin on Ice Making Equipment

As one of the pioneers in mechanical refrigeration, the Vilter Company considers plant layout as important as proper selection of components. The attractive two-color bulletin also describes compressors, condensers, evaporators and other accessories which go into an economical, dependable and profitable ice plant.

Designated as Bulletin Number 914, it is free to ice manufacturers who are contemplating enlargement, replacement or construction of new plants.

MARTOCELLO ICE PICKS

"Cost You Less To Buy The Best"

Immediate Delivery on Plain Handle Ice Picks

BLADES
of High Carbon Tool Steel, accurately tempered to give you maximum use.

HANDLES
of Sound, Clear Hard Wood with Protective Flexible Lacquer Coating.

FERRULES
of Pressed Steel securely registered on Handle and Plated to Resist Corrosion.

PRICES ON PLAIN AND PRINTED HANDLES HAVE BEEN REDUCED! WRITE TODAY FOR NEW PRICES.

Jos. A. Martocello & Co. 229-231 NORTH 13th STREET PHILADELPHIA 7, PA.

"Serving the Ice Industry Since 1916" *"There is no Substitute for* MARTOCELLO QUALITY"

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Air Pressure Tested COILS

Electrically welded, continuous; Air-Pressure-Tested while submerged in water. Built to your specifications. Send for new Coil Data Book and let us quote.

Welded Headers—Welded Ammonia Receivers
Accumulators—Pipe Coils—Bends—Boilers Tubes

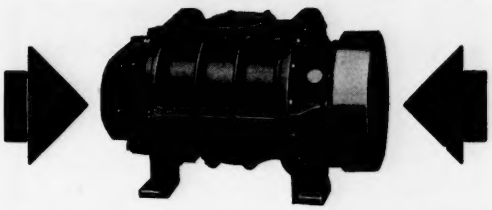
Pittsburgh Pipe Coil & Bending Company
61 BRIDGE STREET, ETNA, PITTSBURGH 23, PA

ACME ... *the Only Gas Mask With the* "PICTURE WINDOWS"

You never have that "jammed-in" feeling, wearing the Acme Full-Vision Gas Mask. Its patented, larger lenses are like picture windows, giving you full natural vision for that safe, unconfined feeling. When you walk, you can actually see your toes without bobbing your head. This factor alone makes Acme outstanding among gas masks . . . well worth looking into.

Write for the complete story on Acme Gas Masks for the refrigeration industry.

ACME PROTECTION EQUIPMENT CO.
3037 West Lake Street, Chicago 12, Illinois



Be Sure of Constant Volume With R-C Blowers

You can rely on R-C Blowers to deliver a predetermined volume of air at a designated pressure today—and in the years to come. Long service records prove also that the strong, simple construction of R-C Blowers assures low power cost and practically maintenance-free operation.

Now is the time to think about replacements or additional capacity to meet next year's requirements. Send for Bulletin R-C 1247, without obligation.

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911 Columbia Avenue Connersville, Indiana
One of the Dresser Industries

ROOTS-CONNERSVILLE BLOWER BUILDERS SINCE 1854

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ENGINEERS
REFRIGERATION SPECIALISTS
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Examinations *Reports* *Valuations*
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Ice Making and Refrigeration - Industrial Power Plants
Reports, Appraisals and Management

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ICE TOOLS AND SUPPLIES

WE CONTINUE YEAR AFTER YEAR
to make the kind of Ice Picks that will give YOUR customers satisfaction and build up GOOD WILL FOR YOU.

PRICE UPON REQUEST

VIVIAN MANUFACTURING CO. 4132-38 Folsom Ave., St. Louis 10, Mo.

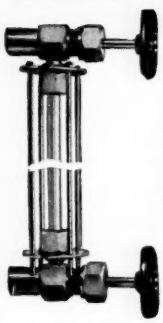
BOWER
-B B Brand AMMONIA

Est. 1858

Immediate shipment and purity of product are two good reasons for specifying Bower Brand. Please keep empty cylinder rotating.

HENRY BOWER CHEMICAL MANUFACTURING COMPANY
29th & GRAY'S FERRY ROAD
PHILADELPHIA, PA.

SHANK REFRIGERATION PRODUCTS



Your Best Buy... The're Dependable

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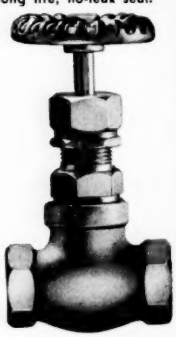
All-Steel GAUGE SETS

All-Steel construction. Automatic shut off of liquid in case of glass breakage. Composition packing rings give long life, no-leak seal.



SEMI-STEEL SHUT-OFF VALVES

Highest grade non-porous metal—full size ports—clean cut threads. Back seated stem—Shank design base—perfect alignment. Long life packing ring.

See your jobber or write for prices

CYRUS SHANK CO.
629 W. Jackson Blvd., Chicago 6, Ill.

THE BUYERS

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AIR COMPRESSORS
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Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N.Y.

AIR PURIFYING EQUIPMENT
General Ozone Corp., Chicago, Ill.

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Voss, Inc., J. H. H., New York, N. Y.

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Creamery Package Mfg. Co., Chicago, Ill.
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Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

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Dersch, Gesswein & Neuert, Inc. Chicago, Ill.

AMMONIA FLOAT VALVES
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Mercoid Corp., The, Chicago, Ill.

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Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bower Chemical Mfg. Co., Henry, Philadelphia, Pa.
Mathieson Chemical Corp., Baltimore, Md.
National Ammonia Div., DuPont, Wilmington, Del.

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Howe Ice Machine Co., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

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Rempe Company, Chicago, Ill.
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Vogt Machine Co., Henry, Louisville, Ky.

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Shank Co., Cyrus, Chicago, Ill.

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Ophuls & Associates, Fred, New York, N. Y.

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Frick Co., Waynesboro, Pa.
Mercoid Corp., The, Chicago, Ill.
Phillips & Co., H. A., Chicago, Ill.
Rex Engineering & Sales Co. Oklahoma City, Okla.
Reynolds Electric Co., River Grove, Ill.

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Union Bag & Paper Corp., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

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Vogt Machine Co., Henry, Louisville, Ky.

BRINE COOLERS
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CHEMICALS
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COAL HANDLING MACHINERY
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Creamery Package Mfg. Co., Chicago, Ill.
Howe Ice Machine Co., Chicago, Ill.
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Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburg Pipe Coil & Bending Co., Pittsburg, Pa.

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Armstrong Cork Co., Lancaster, Pa.
Frick Co., Waynesboro, Pa.
Mundet Cork Corp., Brooklyn, N. Y.
Refrigeration Engineering Corp., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

COLD STORAGE DOORS
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Jamison Cold Stge. Door Co., Hagerstown, Md.
Refrigeration Engineering Co., Minneapolis, Minn.

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(See Air Compressors)

CONDENSERS
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Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc. R. P., Ridgefield Park, N. J.
King-Zeero Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

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Ophuls & Associates, Fred, New York, N. Y.

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Lilly Co., The, Memphis, Tenn.

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Armstrong Cork Co., Lancaster, Pa.
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Vivian Mfg. Co., St. Louis, Mo.

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Armstrong Cork Co., Lancaster, Pa.
Mundet Cork Corp., Brooklyn, N.Y.

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Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Refrigeration Engineering Corp., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

DRINKING FOUNTAINS
Sanitary Equipment Mfg. Co., Inc., St. Louis, Mo.

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DUMPS, CAN
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Coated Both Sides With Paraffine

ANY COLOR

ANY SIZE

We Make Any Design of Ice Signal Card

Send In Your Individually Designed Cards for Quotation

Write for Ice Signal Card Circular and Prices

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LaPorte, Indiana

STOP POWER LOSS

Know at a glance with a FISHER Non-condensable Gas Indicator what excess pressure you are pumping against.

SAVE as much as 20% on power
SAVE on ammonia
SAVE on maintenance

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Price $155.00 fob Los Angeles, Calif.

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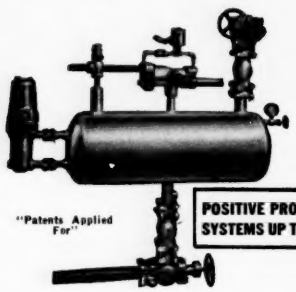
REFRIGERATION POWER ECONOMIZERS
BOX 348 HUNTINGTON PARK, CALIF.

No "Slop Over" with a PHILLIPS LIQUID RETURN SYSTEM



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POSITIVE PROTECTION TO AMMONIA SYSTEMS UP TO 1000 TONS CAPACITY

PHILLIPS LIQUID RETURN SYSTEM effectively traps all suction line liquid in an accumulator and automatically dumps it into the liquid receiver by one of three methods: Gravity, injector pump, or pressure lift. System is adaptable to any installation where "slugging" now takes place, and particularly on booster systems which run on vacuum. On plant extensions the Phillips Liquid Return System offers an opportunity for added economy and efficiency.

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3255 W. CARROLL AVE., CHICAGO 24, ILLINOIS

Your Assurance of Best Quality

REFRIGERATION COILS

made by The National

PIPE BENDING COMPANY

All features that you demand are furnished regularly in National Pipe Bending Refrigeration coils—smooth bends, perfect welds, measurements exact.

For long service specify coils by the National

Pipe Bending Co.

Established 1883

162 River St., New Haven, Conn.

THE BUYERS

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Reynolds Mfg. Co., Springfield, Mo.
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Lilly Co., The, Memphis, Tenn.

ENGINEERS AND ARCHITECTS
(See Architects and Engineers)

ENGINES
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Frick Co., Waynesboro, Pa.

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Niagara Blower Co., New York, N.Y.

EVAPORATORS
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Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Niagara Blower Co., New York, N.Y.
Vogt Machine Co., Henry, Louisville, Ky.

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National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.

FIBERGLAS
Armstrong Cork Co., Lancaster, Pa.

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Gifford-Wood Co., Hudson, N. Y.
United Ice & Oil Supply, Boston, Mass.

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Martocello & Co., Jos. A., Philadelphia, Pa.

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Acme Industries, Inc., Jackson, Mich.
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Rempe Company, Chicago, Ill.

FIRST AID SUPPLIES
Acme Protection Equipment Co., Chicago, Ill.

FITTINGS
Henry Valve Co., Chicago, Ill.

FOOD FREEZING EQUIPMENT
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

FROZEN FOOD LOCKERS
Knickerbocker Stamping Co., Parkersburg, W. Va.
Rempe Company, Chicago, Ill.

FUEL OIL PRE-HEATERS
National Pipe Bending Co., New Haven, Conn.

GAS AND OIL ENGINES
Caterpillar Tractor Co., Peoria, Ill.

GAS INDICATORS, NON-CONDENSABLE
Fisher, C. C., Huntington Park, Calif.

HAND TRUCKS
Ohio Galvanizing & Mfg. Co., Niles, Ohio

HOISTING APPARATUS
Reynolds Mfg. Co., Springfield, Mo.

ICE BAGS
Union Bag & Paper Corp., New York, N. Y.

ICE BLOWERS
Gifford-Wood Co., Hudson, N. Y.

ICE CAN FILLERS
Frick Co., Waynesboro, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Refrigeration Engineering Corp., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

ICE CANS
Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Refrigeration Engineering Corp., Philadelphia, Pa.

ICE CHIPPERS
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Index Coupon & Supply Co., La Porte, Ind.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Co., Minneapolis, Minn.
Refrigeration Engineering Corp., Philadelphia, Pa.
United Ice & Oil Supply, Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CHUTES
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Jamison Cold Storage Door Co., Hagerstown, Md.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.

ICE CONVEYORS
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Refrigeration Engineering Co., Minneapolis, Minn.
United Ice & Oil Supply, Boston, Mass.

ICE CREAM PLANTS
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

ICE CRUSHERS
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.

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United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBE CONTAINERS
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Lilly Co., The, Memphis, Tenn.
Union Bag & Paper Co., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBERS
Flynn & Emrich Co., Baltimore, Md.
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Thermo Cuber Co., Chicago, Ill.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBING MACHINES
Flynn & Emrich Co., Baltimore, Md.
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Thermo Cuber Co., Chicago, Ill.
United Ice & Oil Supply Co., Boston, Mass.

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Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
Pittsburgh Waterproof Co., Pittsburgh, Pa.
Union Bag & Paper Corp., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE ELEVATORS AND CONVEYORS
Gifford-Wood Co., Hudson, N. Y.

ICE HARVESTING MACHINERY & TOOLS
Gifford-Wood Co., Hudson, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

ICE MAKING AND REFRIGERATING MACHINERY
Baker Ice Machine Co., Inc., South Windham, Maine
Creamery Package Mfg. Co., Chicago, Il.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Company, Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
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Refrigeration Engineering Corp., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

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Martocello & Co., Jos. A., Philadelphia, Pa.
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Vivian Mfg. Co., St. Louis, Mo.

ICE PICK SCABBARDS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Martocello & Co., Jos. A., Philadelphia, Pa.
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Vivian Mfg. Co., St. Louis, Mo.

ICE PICK VENDING MACHINES
Towal Mfg. Co. Inc., Mount Vernon, Ill.

ICE PLANTS
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
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ICE RECORDING MACHINERY
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Vivian Mfg. Co., St. Louis, Mo.

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Dickinson & Co., F. B. Des Moines, Ia.
Frick Company, Waynesboro, Pa.
Jamison Cold Storage Door Co., Hagerstown, Md.
Refrigeration Engineering Co. Minneapolis, Minn.
S & S Vending Machine Co., San Jose, Calif.
Thermo Cuber Co., Chicago, Ill.
Towal Mfg. Co. Inc., Mount Vernon, Ill.
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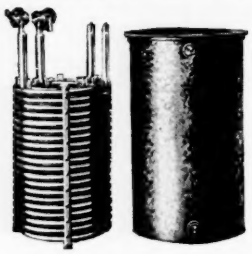

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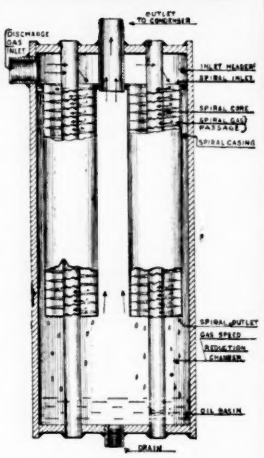

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THE BUYERS

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Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

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Rex Engineering & Sales Co. Oklahoma City, Okla. Baltimore, Md.

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Texas Co., The, New York, N. Y.

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Vogt Machine Co., Henry, Louisville, Ky.

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United ce & Oil Supply Co., Boston, Mass.

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United ce & Oil Supply Co., Boston, Mass.

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Vivian Mfg. Co., St. Louis, Mo.

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Binks Mfg. Co., Chicago, Ill.

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Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.

SPRAY PONDS
Binks Mfg. Co., Chicago, Ill.
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Martocello & Co., Jos. A., Philadelphia, Pa.
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WATER SUPPLY CONTRACTORS
Layne & Bowler, Inc., Memphis, Tenn.

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Mathieson Chemical Corp., Baltimore, Md.
Wright Chemical Corp., Chicago, Ill.

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Philadelphia Pipe Bending Co., Philadelphia, Pa.
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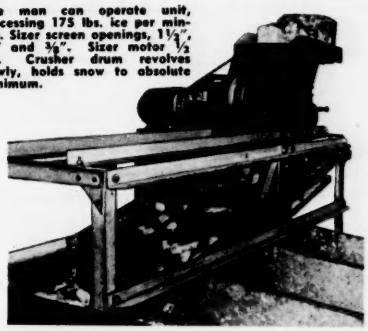
One man can operate unit, processing 175 lbs. ice per minute. Sizer screen openings, 1¼", ¾" and ⅜". Sizer motor ½ HP. Crusher drum revolves slowly, holds snow to absolute minimum.



LOW PRICE: Unit complete with motors, switches and galvanizing ..... $650 less bins
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POSITION WANTED—As Chief or supervising engineer of refrigeration and/or power facilities of ice, cold storage, frozen food plant or allied organization, consisting of individual plant or chain operation. Presently employed as Chief Engineer. Desire to make change to larger and more aggressive concern where my service can be used to better advantage. Experienced with Diesel, steam and electric powered plants, equipment and general maintenance, marine installations. Age 40, married, willing to travel; reference and resume willingly submitted upon request. Address Box NV-2, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

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FOR SALE—At once 20 ton Frick plant complete. To be moved within the next three months. Fort Hill Ice Co., 1400 S. Shelby St., Louisville, Kentucky.

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WANTED—ICE PLANTS. Interested in purchasing one or more Ice Plants located in Middle Atlantic States, each having minimum production of 20 tons daily. Must have sales, or market, potential permitting operation at minimum of 40% of load factor. Address Box NV-8, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

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FOR SALE—Wilson refrigeration and freezer equipment. Home and commercial; various models, sizes; all brand new. Due to other business, must liquidate. Will sacrifice below cost. Phone, wire, write Walter Davis, 321 So. Main St., Memphis, Tenn

FOR SALE—7x7 Frick high speed compressor complete with 50 h.p. Westinghouse motor and auto-starter. Also pre-cooling coils and tanks. Excellent condition. 1—Mathews impeller type vegetable washer complete; used very little. Could pumps and gear reducers; write for complete description of washhouse equipment. C. Roy Curtis & Son Inc., Marion, New York.

FOR SALE—Two 4x4 Yorks and two 3x3 twin Fricks, self-contained units. 3x3, 4x4, 5x5, 6x6, 7½x7½, 8x8 and 9x9 York compressors, splash lubrication. One 40 ton horizontal Vogt shell and tube condenser. 5 Acme Freon suspended type blower units. Write E. Niebling, 1318 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE—Price reduced on compressors. York 9x9, $650.00; York 5x5, $350.00; 4x4, $250.00; Frick 4x4, $300.00; Frick self-contained, automatic, $250.00; Triumph 5x5, $150.00; Frick 7x7, $500.00; Frick 5x5, $400.00; motors $3.00 per h.p. Shell & tube condensers; receivers and oil traps; 3,000 ft. 1¼ coil, 15c per ft. Ice tongs, 75c each. Write us what you need in refrigeration equipment. Gordon Equipment Co., 6530 W. Jefferson Ave., Detroit 17, Mich.

FOR SALE—One 6¾"x5" V/W York ammonia booster compressor 8 cylinder V-belt drive complete with base, including 440 volt A.C. motor and 36"x12' long D.E. gas and liquor cooler plus valves. This equipment is new and has never been installed. If interested contact W. A. Moore, General Manager, New Orleans Cold Storage & Warehouse Co. Ltd., 305 Gaiennie St., New Orleans, La.

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1—20 ton York ice plant electric driven.
1—30 ton York ice plant electric driven, herringbone coils, late type.
1—100 tor ice plant, electric driven.
1—10" x 10" York two cylinder ammonia compressor.
1—6½" x 6½" two cylinder York ammonia compressor, high speed.
1—6" x 6" two cylinder Frick ammonia compressor, high speed.
1—6" x 6" two cylinder Voss high speed ammonia compressor.
2—4" x 4" two cylinder York high speed ammonia compressor.
1—3" x 3" two cylinder Frick unit, high speed.
1—York shell and tube condenser, 2½" dia. x 16' L., 51—2" tubes.
2—16" dia. x 10'-0" long 6 pass enclosed type ammonia condenser.
1—25" dia. x 10'-0" long 5 pass enclosed type ammonia condenser.
2—Perfection ice scoring machine 300# blocks.
600—11" x 22" x 48" ice cans.
Brine coolers, double pipe 2" and 2" horizontal brine coolers, submerged shell and tube type, 1¼" and 2" ammonia coils, approximately 10,000 feet. Send us your requirements on any equipment you may need.

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FOR SALE—Two 2 h.p. agitators; one 3 h.p. agitator; one 1 h.p. core pump; one 5 h.p. blower; one 3 h.p. blower; one Uline scoring machine; 206 cans 11 x 22 x 50; 350 cans 11½ x 22½ x 45. Write P.O. Box 53, Cincinnati, Ohio.

FOR SALE—Large Champion ice crusher that can crush a 300# block of ice at one time. It has bucket elevators to elevate the crushed ice so that sizing with screens is practical. Write for further information. The Terminal Cold Storage and Ice Co., 20-40 Eaker St., Dayton Ohio.

FOR SALE—ICE PLANTS & EQUIPMENT

1—40 ton York ice making plant—brine coolers electric driven.
1—30 ton York ice making plant—trunk coil 4 can pull electric driven.
2—20 ton York ice making plants—brine coolers electric driven.
1—5 ton York ice making plant—brine cooler electric driven.

AMMONIA COMPRESSORS

1—16 x 18 York direct connected to 375 h.p. synchronous motor.
1—10 x 10 York 360 r.p.m. F.F.L.
1—10 x 10 York 275 r.p.m. F.F.L.
1—9 x 9 York 250 r.p.m. F.F.L.
1—8 x 8 Creamery Package direct connected to 40 h.p. synchronous motor.
2—7 x 7 Worthingtons 400 r.p.m. 50 h.p. motors.
1—6½ x 6½ York 300 r.p.m. F.F.L.
1—6¼ x 6¼ Baker 300 r.p.m. F.F.L.
1—6 x 6 York 300 r.p.m. F.F.L.
1—6 x 6 Frick 277 r.p.m.
1—5 x 5 York self contained unit.
1—4 x 4 York self contained unit.
4—16" dia. x 18' long horizontal shell & tube condensers, 42—1¼" tubes.
1—Gifford Wood ice scoring machine 300# blocks.
4000' of 2" pipe coils, 20' & 10' lengths 8" flanged return bends.
1—15 ton diffuser floor type, with automatic controls.
1—40 h.p. Venn-Severin Diesel engine.

B & E REFRIGERATING CO.
2 Orange St., Newark 2, N. J.
Phone: Mitchell 3-7790 3-7791 Cable Address "BERECO"

FOR SALE—4 Ingersoll-Rand ammonia compressors 50, 90 and 100 tons, direct connected to synchronous motors. 1 York 6½ x 6½ h.s. V belt, forced feed direct connected to synchronous motors. 1 York 6½ x 6½ h.s. V bit, forced feed lubrication. 1 York 6½ x 6½ slow speed. 1 new 8½ x 8½ Vilter V belt drive. 3 transformers. 500 ice cans 300 lbs. 2 large brine coolers; electric cranes; 10,000 ft. 2" ammonia pipe with return bends, like new. 4 high pressure boilers. H. Loeb & Son, 4643 Lancaster Ave., Philadelphia 31, Penna.

FOR SALE—Complete 20 ton Arctic Pownall ice making plant with two compressors; 1—each York 9x9, Frick 6x6, York 5x5 self-contained unit; Baker 4½x5 self-contained unit. Two 4 cylinder Lipman 4 ton self-contained units. 150 ton Skinner-Uniflo DeLaVergne unit. 1¾"x5" weld return bends. Frick 10x10 crank shaft and pistons. Flywheels. 1 each 150 and 180 h.p. Fairbanks-Morse Diesel engines 1 each 40 and 60 KVA generators complete. Freezer doors, pipe coils, ammonia fittings; 15 h.p. DC G.E. motor. One 25 h.p. AC G.E. motor. Parke Pettegrew & Son Co., 370 W. Broad St., Columbus 8, Ohio.

FOR SALE — SURPLUS EQUIPMENT

LOCATION: City Ice Supply Co., East Chicago, Ind.

2—Vertical agitators—1200 RPM—3 HP 9" Blades
3—5" Vilter Ammonia valves
2—8 x 9 High pressure Penn Air compressors
1—50 HP 860 RPM 220 Volt motor
1—5 HP 2½" 200 GPM 50 ft. Head pump
1—GE—335 CFM 3 #8.5 HP 3450 RPM air blower
1—600 CFM—3 lb. Positive pressure Hoffman blower, 200 Volt 60 Cycle 3 Phase. In operation 6 months.
2—100# Thermo Cubing machines complete with pumps and gas boiler.
18—1½" Angle ammonia valves
24—1 inch Angle ammonia valves.

LOCATION: Fulton Pure Ice Co., 7400 S. Ada St., Chicago, Ill.

2—20 HP 3/60/220 Volt 685 RPM Allis Chalmers motors with starters
1—25 HP 3/60/220 Volt 865 RPM Ideal motor with starter
3—#2 Nash air blowers
1—100 HP Slip ring GE starter
1—165 HP Air Breaker starter
1—4 Cylinder 30 HP Buda Gas engine
1—1924 Mack dump truck
4—2½" Angle ammonia valves

For information required relative to the above lists of equipment, please contact

ELMER SMITH

7400 S. Ada St. CHICAGO or telephone **HUdson 3-2100 ILLINOIS**

USED ICE MACHINES AND EQUIPMENT

All Used Equipment Is Reconditioned in Our Modern Machine Shop

THIS IS ONLY A PARTIAL LIST—WRITE ABOUT ANY REQUIREMENTS WHICH YOU HAVE WE ARE BUYING ADDITIONAL EQUIPMENT ALL OF THE TIME.

Compressors With or Without Motors

	Item No.
1—4x4 York, 300 RPM	16
6—6x6 York's, 200 RPM	20
1—6x6 Frick, 257 RPM	21
2—6½x6½ Arctics, 350 RPM, forced feed lub.	30
1—7¼x7¼ Baker, 350 RPM, forced feed lubrication	35
1—7x7 Frick, 200 RPM	40
1—7½x7½ York, 200 RPM	51
2—9x9 Arctic, 300 RPM, forced feed lub.	62
1—9x9 Frick 225 RPM direct connected to a 60 HP synchronous motor, forced feed lubrication	67
2—9x9 Late type Yorks, 400 RPM, forced feed lub.	69
1—9x9 Frick, 200 RPM	70
1—9x9 York, 200 RPM	71
1—9x9 Worthington, 325 RPM, forced feed lub.	72
1—10x10 De La Vergne, 360 RPM, forced feed lub.	73
1—10x10 York, 257 RPM, forced feed lub.	80
1—10x10 Carbondale, 100 HP synch. motor, 350 RPM	81
3—10x10 York's, 225 RPM, semi-forced feed lub.	82
1—12x12 Frick, Forced feed, 300 RPM	89
1—11x13 York, 164 RPM, forced feed lub.	90
1—17x18 Frick, direct conn. 300 HP synch. motor	91

Diesel Driven and Diesel Engines

1—8x8 York—Direct connected to 50 H.P. Fairbanks-Morse at 257 R.P.M.	210
1—175 H.P. Fairbanks-Morse Diesel engine	211
1—150 H.P. Van Severin—300 R.P.M.—Diesel engine	212

Steam Driven

1—18 ton Vertical 6½x6½ Arctic	321
1—7½x7½ Vertical York, 200 R.P.M. direct connected to steam engine	326
1—8x8 Vertical York, 300 R.P.M. direct connected	327

Complete Ice Plants

	Item No.
1—15-ton electric driven plant	630
1—600 Can Trunk Coil Type—York Plant, Brand New Tank. *Complete with 10 Can Grids. This plant is equal to new*	631
Brand New 8 to 10-ton Clear Ice-Making Plants—110 Cans—Electric or Diesel Drive—2 Can Pull	632
2—247 Can, 22-ton ice plants, like new	632A
1—35-38 ton New Clear Ice Making Plants	635

Self-Contained Units

1—5x5 York—390 R.P.M.	743
1—4½x5 Lipman—360 R.P.M.	744
1—3x3 Worthington	748
1—5x5 Frick—Forced Feed—400 R.P.M. Latest Type	758

Brine Coolers

1—34x12—96—2—Retubed	801
1—34x10—100—2	802
1—48"x16'—130—2" tubes	808

Condensers

3—100 ton shell and tube condensers retubed	919
2—Stands—Vogt Multi-tube—Each stand 6 pipes high. Each pipe 9"x18" with 7—2" tubes	920
1—125-ton, Vertical Shell & Tube, 196 2" tubes	921
1—120 ton, 216—2" retubed Vertical Shell & Tube	922
2—20 ton Horizontal—retubed	924

Ice Cans

400—11½"x22½"x44"—cap refinished in zinc

Pipe

10,000 feet wrought Iron pipe—2"—like new	451

NEW EQUIPMENT FOR IMMEDIATE DELIVERY

Compressors With or Without Motors

	Item No.
3x3 to 5 x 5—390 R.P.M.	1001
6x6 to 10x10—390 R.P.M.	1002
3x3 to 5 x 5—Self-contained units, complete	1003
5x5—Self contained—15 H.P. motor—V Belt	1004

Ammonia Condensers

4—12¾x12 Horizontal—36—1¼" tubes	1020
2—30x14 Vertical 109—2" tubes	1021
1—16"x10"x10' Shell and Tube Condenser, 60 1¼" tubes	1022

Evaporative Condensers

Ice Cans

50—100 lb. cans—15½"x8"x31"	1041
40—50 lb. cans—6"x12"x26"	1042

Ammonia Valves and Fittings

	Item No.
⅜" to ¾"—Screwed Expansion Valves	1050
½" to 2"—Screwed Globe Valves	1051
1" to 6"—Square Flanged Globe Valves	1052
Check Valves	1053
Relief Valves	1054
Strainers	1055
Steel & Malleable Fittings	1056
Extra heavy Ammonia Nipples	1057

Ammonia Gauges

High and Low Pressure Type	1060

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All Sizes.

Ice Crushers

Gas and Electric Driven	1070

Agitators

New 2 H.P. and 3 H.P. Vertical Agitators

Cold Storage Doors

Receivers and Oil Separators

All sizes	1080

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RIDGEFIELD PARK, N. J.

PHONE: HAckensack 2-8554-5
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BARRETT Standard Anhydrous Ammonia has a higher refrigerating effect, per unit liquid volume, than any other type of refrigerant. This means *more* refrigeration per pound of refrigerant used.

Other advantages of using Anhydrous Ammonia are: low initial cost, low power consumption, low friction losses and low vapor density.

These characteristics, together with consistent purity, and uniform quality, have made Barrett Standard Anhydrous Ammonia the outstanding choice of refrigerating engineers since 1890.

Barrett Standard Anhydrous Ammonia —the reliable, dependable, all-purpose refrigerant—is available in 150, 100 and 50-pound cylinders for *speedy delivery* from stock points conveniently located from coast to coast.

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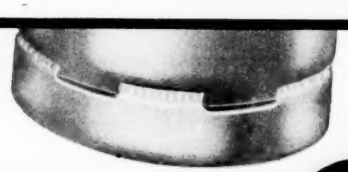

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
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Barrett

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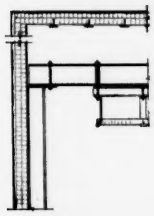

● INTERIOR FRAMEWORK?

This method provides for tracking support by a structural framework erected within the insulated room.

WHICH IS THE BETTER WAY TO HANG TRACKING?

● EXTERIOR FRAMEWORK?

An alternate method is to provide support by puncturing the insulation seal and supporting track hangers from the building structure.

There are two methods by which overhead tracking can be installed in insulated rooms. One is to suspend the tracking from a structure built entirely within the room. The other is to hang it from overhead supports. Whenever possible, the first method should be followed. A structural framework entirely within the insulation envelope avoids puncturing the vapor seal. These punctures allow heat infiltration, and they become enlarged by vibration. Then, moisture and ice can collect around the hanger rods, resulting in loss of insulating efficiency at these points.

With certain types of construction, interior support is impossible, and the insulation must be punctured. Then, precautions should be taken to reduce heat infiltration at the punctured points. When suspended ceilings are used, for example, cork sleeves applied to the hanger rods above the ceiling prevent frosting of rods and damage to insulation.

If you have a problem concerning low-temperature insulation, phone an Armstrong engineer at any of Armstrong's District Offices. His advice will be based on wide experience as well as sound engineering principles. And using Armstrong's Contract Service for your insulation work will assure you of the best materials and finest workmanship. For complete details on this service write to Armstrong Cork Company, 4511 Concord Street, Lancaster, Pennsylvania.

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FOR ALL TEMPERATURES FROM 300° F. BELOW ZERO TO 2800° F.

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Modern breweries demand the finest in equipment to assure the uniformly high quality of their product.

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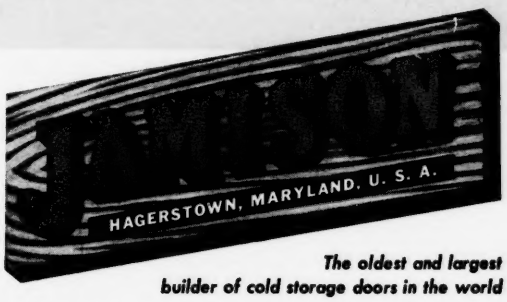

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